InterChange
iQ 2000 and iQ 2000plus
User Guide

WESTELL

Acknowledgements

Information in this document is subject to change without notice and does not represent a commitment on the part of Westell Limited. The software may be used or copied only in accordance with the terms of the purchase agreement. It is against the law to copy the software on any medium except as specifically allowed in the purchase agreement. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying or recording, for any purpose without the permission of Westell Limited.

Trademarks

Westell Limited recognises all third party trademarks.

Change History

Issue	Product	Status	Date
010	Wes IiQ 2000 User Guide	First Issue	
020	Wes IiQ 2000 User Guide	Phase 2	Dec 2000
030	Wes IiQ 2000 User Guide	Frozen	Apr 2001
040	Wes IiQ 2000 User Guide	Restyle	Mar 2002
050	Wes IiQ 2000 User Guide	Update	Jan 2003
060	IiQ 2000plus User Guide	Revised	Jun 2003
070	IiQ 2000plus User Guide	Revised	Nov 2004

Westell limited

Ringway House
Bell Road
Daneshill
Basingstoke
Hampshire, RG24 8FB
United Kingdom

Tel: +44 (0) 1256 843311
Fax: +44 (0) 1256 840429
email: info@westell.co.uk
www.westell.co.uk

© Copyright 2003, 2004 Westell limited
All rights reserved

Document number: UM 380 03 010

Contents

Acknowledgements 2
Trademarks 2
Change History 2

Preface 1
Scope of this Guide 1
Management 1
Vision iQ 2

1 Introduction 3
1.1 InterChange iQ 2000 3
1.2 InterChange iQ 2000plus 4
1.3 Management with Vision iQ 4
1.4 Environment 5
1.4.1 External Dimensions and Weight 5
1.4.2 Power Requirement 5
1.5 Approvals and Safety 5

2 Hardware Installation Procedure 6
2.1 Introduction to Unit Installation 6
2.2 Unit Installation 6
2.2.1 Unpacking and Inspection 6
2.2.2 Hardware Installation 7
Back Panel Equipment 7
2.3 Power-On and Self-Test 9
2.3.1 Terminal Connections 9
2.3.2 Self-Test 9
2.4 Vision iQ Management Software Installation 10
2.5 InterChange iQ 2000 and 2000plus Installation 10
2.5.1 Set Factory Default Values 11
2.5.2 Set Time and Date 11
2.5.3 Protocol Configuration 12
2.5.4 Configuration using the Quick Start wizard 13
2.5.5 Configuration changes (for manual changes to the default settings) 13
2.6 Cabling into a Management System 14
2.6.1 Alarm Signal Cabling 14
2.6.2 Alarm Signal Cable Test 14
2.6.3 Management Terminal Cabling 14
2.6.4 Management Terminal Cable Connection Test 14
2.7 Network Cabling 15
2.7.1 Port Usage 15
2.7.2 Cabling Practice 15
2.7.3 Cabling Procedure 15

3 Switches and LEDs 17
3.1 Switches 17
3.1.1 Power ON/OFF switch 17
3.1.2 Sync switch 17
3.1.3 Port Impedance switches 17
3.2 Front Panel LEDs 17
3.2.1 Status LEDs 17
3.2.2 LAN LEDs 18
3.2.3 Port LEDs 18
3.2.4 Power LED 18

4 Management using Vision iQ 19
4.1 Configuration 19
4.2 Upgrade Configuration Procedure 19
4.3 Software Components 19
4.4 PC to InterChange Connection 19
4.4.1 Serial Link 19
4.4.2 Ethernet Connection 20
4.4.3 PC Specification 20
4.5 Software Installation 20
4.6 Configuring Vision iQ for use with InterChange iQ 2000 units 21
4.6.1 Starting Vision iQ 21
4.6.2 Working with Vision iQ 21
4.6.3 Vision iQ Mode Options 22
4.7 Connect 23
4.7.1 Connection 23
4.7.2 Disconnect 24
4.7.3 Reconnect 24
4.7.4 Shelf Definitions 24
4.7.5 Shelf Properties Group 25
4.7.6 Shelf Definitions Present Group 25
4.7.7 Define Poll List 27
4.7.8 Global Poll 28
4.8 Diagnostics 29
4.8.1 Diagnostics Overview 29
4.8.2 System Page 30
4.8.3 Module Page 30
4.8.4 Hardware Page 31
4.9 Major Alarms 31
4.10 Port Errors 32
4.11 Call Statistics 33
4.12 Loopback 34
4.13 Using the Configuration Wizard 34
4.14 InterChange iQ 2000plus Enhancements 43
4.14.1 Proxy Diversion 43
4.14.2 Redirection Timeout 43
4.14.3 Q.932 Redirecting Number Information 44
4.14.4 CCM Message Waiting Indication 44
4.14.5 Configuration Wizard Variation 44

5 Conversions and Transparency 45
5.1 Q.931/DPNSS Conversion 45
5.1.1 Default Configuration 45
5.1.2 Configuration Options 45
5.2 Transparent Signalling 47
5.2.1 Overview 47
5.2.2 Supported Services 47
5.3 Interworking Between DPNSS & QSIG Equipment 48
5.4 IiQ 2000plus Proxy Interworking Between DPNSS & Q.931 49
5.5 Interworking DPNSS with Cisco Call Manager 50

6 Manual Configuration or Upgrade of Software Protocol Options 52
6.1 General Module Configuration Procedure 52
6.1.1 The Configuration Menu System 52
6.1.2 Menu Help Facilities 52
6.1.3 Confirming Configuration Changes 52
6.2 Manual Configuration and Upgrade Options 53
6.2.1 Resource Manager Configuration (MGMT) 53
6.2.2 Channel 0 Configuration (CZ) - Delay Timers 53
6.3 Q.931/DPNSS Conversion Configuration 54
6.3.1 Port 1 (Q.931 port) Configuration 54
6.3.2 Port 2 (DPNSS port) Configuration 55
6.4 DPNSS/QSIG Transparency Options Configuration 57
6.4.1 DPNSS/QSIG Transparency 57
6.5 Advanced Service Interworking 58
6.5.1 DPNSS Message Waiting Implementations 58
6.5.2 ISDX Voice Messaging Systems 59
6.5.3 Name Mapping 59
6.5.4 Route Optimisation Options 60
6.5.5 QSIG Facility Element Encoding 60
6.5.6 QSIG Diversion Restriction 61
6.6 Configuring InterChange iQ 2000plus Proxy Services 63
6.6.1 Proxy Diversion Address Filtering 63
6.6.2 Operator Redirection 64
6.6.3 Service Spoofing 64

7 Problem Determination 65
7.1 Introduction 65
7.2 Power-On Problems 65
7.3 Operational Problems 66
7.4 Diagnostic Procedures 68
7.4.1 Power Supply 68
7.4.2 Self Test Failure 68
7.4.3 Port Failure Alarm 68
7.4.4 Checking Cables 69
7.4.5 Loop-Back Testing 70
7.4.6 Call Failures 70
7.4.7 Fatal Errors 71
7.4.8 Event Reporting 72
7.4.9 SNMP Traps 72
7.4.10 Call Tracing 73

8 DPNSS Compliance Tables 74
8.1 Basic Call 74
8.2 Data Call 74
8.3 Executive Intrusion (Partial Support) 75
8.4 Diversion 76
8.4.1 Diversion - Immediate 76
8.4.2 Diversion - On Busy 78
8.4.3 Diversion - On-No-Reply 79
8.5 Hold 80
8.6 Three Party 81
8.7 Call Offer 82
8.8 Service Independent Strings 82
8.9 Bearer Service Selection 83
8.10 Route Optimisation 83
8.11 Redirection 84
8.12 Centralised Operator 86
8.13 Add-On Conference 88
8.14 Do Not Disturb 89
8.15 Loop Avoidance 89
8.16 Network Address Extension 90

Appendices
A Approvals, Safety Instructions and Statutory Information 91
B References & Technical Specifications 98
C Cabling Specifications 102
D Glossary of Terms 104

Preface

Scope of this Guide

This Guide describes the hardware and software of the Vision iQ managed InterChange iQ 2000 and iQ 2000plus products, the installation, maintenance and general operation.

The Guide is divided into the following sections:

Chapter 1 **Introduction.**

Chapter 2 **Hardware Installation Procedure.**

Chapter 3 **Switches and LEDs.**

Chapter 4 **Management using Vision iQ.**

Chapter 5 **Conversions and Transparency.**

Chapter 6 **Manual Configuration or Upgrade of Software Protocol Options.**

Chapter 7 **Problem Determination.**

Chapter 8 **DPNSS Compliance Tables.**

Appendices

A **Approvals,Safety Instructions and Statutory Information**

B **References and Technical Specifications**

C **Cabling Specifications**

D **Glossary of Terms**

Management

InterChange iQ 2000 products are designed for years of error-free running with little, or no, requirement for management involvement once initial set-up is complete. Normally any network faults are notified and diagnosed from alarms provided by the attached equipment, after interaction with the InterChange unit, and it is superfluous and confusing to network operations staff to have these indications repeated at a second interface.

For the rare cases where installation philosophy requires direct notification of alarms, InterChange iQ 2000 and iQ 2000plus have four types of management interface:

- LEDs,
- A relay which can make or break an alarm circuit in the event of a major hardware related failure,
- An RS-232 serial interface which can be used for fault diagnosis and configuration management, either from a locally connected PC running Vision iQ, or from a remote PC via a modem link, and
- Ethernet.

These interfaces operate concurrently and quite independently.

Vision iQ

Vision iQ is a Windows application for managing the InterChange iQ 2000 and iQ 2000plus.

Vision iQ is used to download protocol conversion software to the InterChange unit from a PC, using the Download utility. The product is configured using the Vision iQ application described in this manual. Vision iQ also manages the operational, diagnostic and alarm information for each port used in the conversion or channel grouping.

Vision iQ identifies the software and hardware facilities available on an InterChange unit and displays parts or all of the configuration and management dialogues accordingly.

1 Introduction

1.1 InterChange iQ 2000

InterChange iQ 2000 is a dual port ISDN unit designed to perform signalling and service reconciliation between two unlike ISDN signalling systems.

It is typically deployed to attach:

- a QSIG (or DPNSS) PBX to a DPNSS (or QSIG) network, or
- a number of DPNSS PBXs to a QSIG or Q.931 backbone (e.g. VoIP or ATM) network, or
- a DPNSS PBX to a Q.931-based Public ISDN service (such as 'ISDN 30e').

When attaching a QSIG (or DPNSS) PBX to a DPNSS (or QSIG) network, InterChange iQ 2000 provides seamless service interworking between the attached PBX and other PBXs in the network, including inter-operation of most of the commonly used services.

InterChange iQ 2000 facilitates basic call interworking, including simple services such as calling and connected identity when attaching a number of DPNSS PBXs to a QSIG or Q.931 backbone network, or a DPNSS PBX to a Q.931-based Public ISDN service.

In addition, when attaching a number of DPNSS PBXs to a QSIG or Q.931 backbone network and the core network supports QSIG signalling, InterChange iQ 2000 can transport DPNSS signalling across the network and deliver it practically transparently via a similar InterChange unit to a remote DPNSS PBX. In this mode all DPNSS Supplementary Services are supported apart from some link-specific Traffic Channel maintenance services.

InterChange iQ 2000 supports 2 E1 Primary Rate [2 Mbit/s (30B + D) Common Channel Signalling] interfaces; providing a single Primary Rate conversion. It is a portable unit that can be mounted on a desk. A kit of brackets is also available to allow the unit to be installed on a 19 inch rack. It is particularly suited for use in Customer Premises Environments (CPE) to interface equipment into Virtual Private Networks.

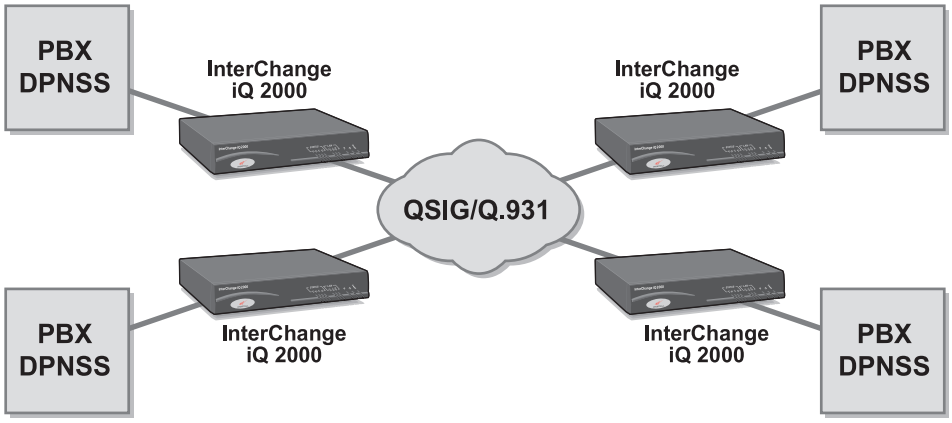

Figure 1: InterChange iQ 2000 in a Private Network.

Figure 1 shows DPNSS PBXs interconnected across a QSIG network. In this configuration, the combination of InterChange units and the network behave as a single DPNSS transit node and transports DPNSS supplementary signalling.

Figure 2: InterChange iQ 2000 in a CPE.

Figure 2 shows an InterChange iQ 2000 interfacing a PBX using the UK standard DPNSS protocol to the QSIG/Q.931 protocol.

Conversions operate on the common signalling channel only. Bearer circuits are passed directly through the unit. Each protocol support is configurable to meet specific application needs.

The Virtual Private Network protocol support can be configured to operate into sub-equipped ISDN trunks, allowing the user to maximise the benefits of the advantageous Primary Rate ISDN tariffs now being offered by some PTOs.

1.2 InterChange iQ 2000plus

The IiQ 2000plus is a variation of the InterChange iQ 2000 providing some additional facilities:

- The ability to perform diversions on behalf of the PBX; and
- Support for the Q.932 ‘redirecting number’ element for diversion;
- Advanced Wizard custom configuration for Cisco Call Manager;
- The ability to display DPNSS Message Waiting Indications on telephones controlled by Cisco Call Manager.

If a unit is first installed with version R.2.1.0 of the operating software, an IiQ 2000 may be upgraded to an IiQ 2000plus. For more information on the upgrade, contact your distributor / reseller or Westell Account Manager.

1.3 Management with Vision iQ

Vision iQ, the Management Interface, provides the facilities to connect (locally or remotely) to an InterChange iQ 2000 or iQ 2000plus, display diagnostic information and configure the unit.

Vision iQ allows you to:

- connect and disconnect from the management terminal,
- set up a definition for the InterChange iQ 2000 or iQ 2000plus unit,

- display diagnostic information which includes:
  - impedance settings,
  - Port Error, Major Alarm and call statistics,
- Global polling of a list of remote InterChange iQ 2000 and iQ 2000plus units,
- configure the InterChange iQ 2000 or iQ 2000plus unit, and
- enable SNMP traps to up to 8 recipients.

New applications or updates are loaded into the InterChange iQ 2000 and iQ 2000plus unit's flash memory using the Download facility in Vision iQ.

1.4 Environment

Both InterChange iQ 2000 and iQ 2000plus units can be mounted in a cabinet or installed free standing and should be sited to allow free movement of air for cooling purposes.

1.4.1 External Dimensions and Weight

Unpacked InterChange iQ 2000 and iQ 2000plus units are 275 mm wide x 217 mm deep x 50 mm high, and weigh 1.4 Kg. All diagnostic indicators are visible at the front and all cable access is at the rear.

1.4.2 Power Requirement

The operating input voltage range is 100 - 240 VAC (50-60 Hz) with a power consumption of maximum 10W.

The fuse and the On/Off switch (single pole) are accessible from the rear of unit

1.5 Approvals and Safety

The InterChange iQ 2000 and iQ 2000plus are approved for connection to telecommunications systems, subject to conditions set out in this User Guide.

All users of the product must make themselves familiar with the Safety Information contained in Appendix A.

Users must also be aware of the approvals information in Appendix A and, for use in the U.K, comply with the statutory requirements for connection to a Public Network, also outlined in Appendix A.

2 Hardware Installation Procedure

This chapter takes the suitably trained and qualified person through the process of:

- installing an InterChange iQ 2000 or iQ 2000plus unit,
- initial testing,
- cabling, and
- operational checks.

Warning:

Read the Safety Instructions in Appendix A before beginning installation. Installation should only be carried out by a qualified trained Engineer.

Installation can begin when the site has been correctly prepared.

2.1 Introduction to Unit Installation

To install an InterChange iQ 2000 or iQ 2000plus unit, carry out the following tasks in order:

- Unpacking and Inspection
- Hardware Installation
- Power-On and Self-test
- Configuration
- Operational Checks
- Cabling to the Network

2.2 Unit Installation

2.2.1 Unpacking and Inspection

The InterChange iQ 2000 is supplied in a single package containing the following:

- An InterChange iQ 2000 or iQ 2000plus unit.
- Mains cable.
- Management cable.
- 120 Ohm crossover cable (for use in Cisco networks).
- Safety Guide with Approvals, Safety Instructions and Statutory Information.
- Hard Copy Quick Start Guide.
- CD with Vision iQ and Protocol Application Software, User Guide and Quick Start Guide.

The packaging is externally labelled with the order code and contents. Check this against the order form and packing slip to make sure that the correct system type has been received. Return the unit if there is any discrepancy.

Save the packaging material and store it in a clean, dry area for re-use if the equipment is to be moved.

2.2.2 Hardware Installation

Note: There is no physical difference between the InterChange iQ 2000 unit and the iQ 2000plus unit.

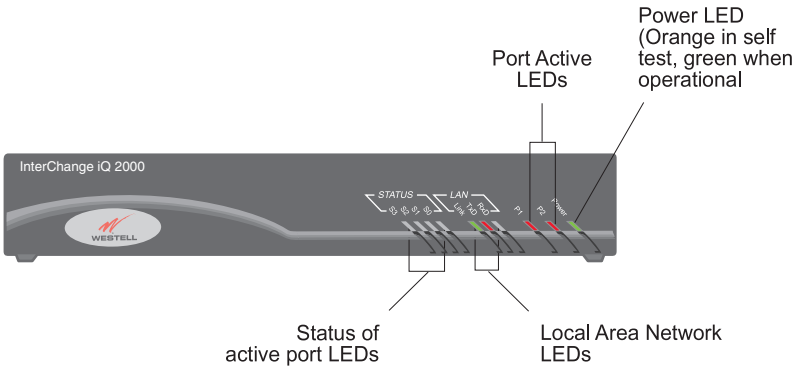

Figure 3: Front View of an Interchange iQ 2000 unit.

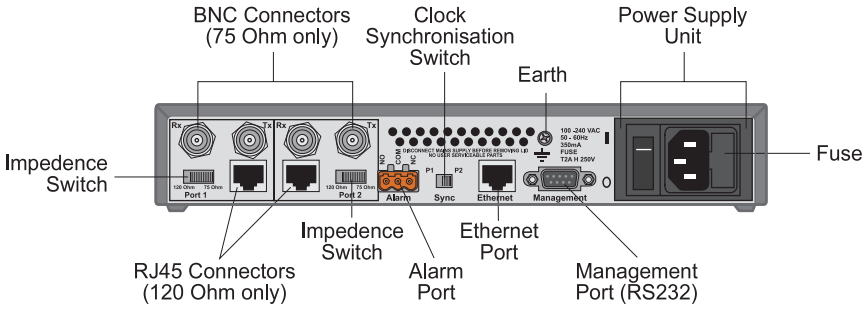

Figure 4: Rear View of an InterChange iQ 2000 unit.

Back Panel Equipment

- Impedance Switch - Refer to Section 3.1.3
- BNC Connectors - Refer to Section 2.6
- RJ45 Connectors - Refer to Section 2.6
- Alarm Port - Refer to Appendix B.9
- Clock Synchronisation Switch - Refer to Section 3.1.2
- Ethernet Port - Refer to 2.6.3
- Management Port - Refer to section 4
- Power Supply Unit - Refer to section 1.3.2

Caution:

The Interchange iQ 2000 and iQ 2000plus must be earthed at all times via the protective earth terminal on the rear of the unit.

The earthing cable must conform to the following specification. It shall:

- be PVC covered green with yellow longitudinal coloured stripes as defined in EN 60950,
- be rated at 17 amps,
- have a cross sectional area of 1.5mm$_2$,
- be of stranded wire 7/0.53, and
- be terminated with an M3 ring terminal 1-2.6 mm$_2$ conductor.

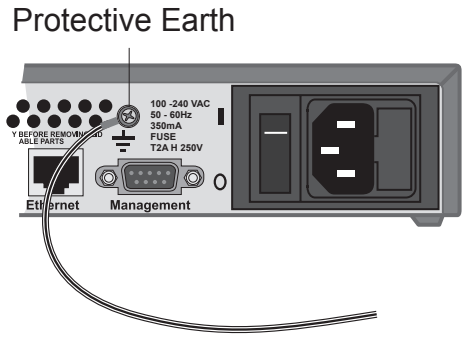

Figure 5: View showing earth screw on the rear panel.

Location of Unit

Make sure that there is free flow of air between the base of the unit and the surface on which it is installed.

Connecting to Power

Make sure the mains switch on the mains inlet panel at the rear of the unit is set to the **OFF** (**O**) position.

Use the power cable provided to connect between the mains inlet and the designated line distribution socket.

2.3 Power-On and Self-Test

2.3.1 Terminal Connections

To run installation and configuration software, access via a PC with Vision iQ is required. A terminal can also be used as a monitor while the self-test software is running.

On the rear panel of the unit is a 9-way D type connector marked **Management**, as shown in *Figure 4*. To connect a PC, refer to the cabling and communications specifications in *Appendix C*.

1 Make sure that no ISDN cables are connected to the rear of the unit.

2 Make sure electrical power is available and set the unit mains switch (located on the rear panel at the right of the unit) to **ON** (**I**).

3 Check that the Power LED comes on ORANGE. This is the right-hand LED on the front panel, shown in *Figure 3*.

2.3.2 Self-Test

When power is first applied, the **Power** LED on the front panel comes on ORANGE and the four **STATUS** LEDs come on and go off in sequence (from left to right) to indicate the unit is performing the Self-Test. This is a sequence of tests (stored in the Boot Flash) which check correct operation of the hardware functions. Allow this to run to completion. The Self-Test should complete in less than one minute.

Successful Self-Test

When all the tests have completed successfully, the Self -Test Module invokes the Loader module. The **Power** LED changes colour from ORANGE to GREEN.

Self-Test Failure

If any test in the sequence fails then the cycle of the **STATUS** LEDs will stop (with one LED remaining on) and the **Power** LED will remain ORANGE.

At the end of the test sequence, the self-test software does not pass control on to the operational software. At a 30 second repeat interval the terminal (if connected) receives a summary of all errors found during the self-test. The self-test will attempt to re-run approximately every five minutes. This is done to guard against any transitory problems.

When an error is indicated consult *Chapter 7 Problem Determination*, for the appropriate corrective action. Once errors have been corrected make sure the self-test runs satisfactorily to completion. Only proceed when self-test passes. InterChange iQ 2000 and iQ 2000plus are made to reset and re-run its self-test by setting the power switch on the rear of the unit to **OFF** (**O**) then setting it to **ON** (**I**).

When self-test has been completed correctly you may proceed to perform configuration and the operational checks.

2.4 Vision iQ Management Software Installation

Note:

Windows® NT users must have administrator user rights to install Vision iQ.

Follow this procedure to install Vision iQ:

1 Start Windows® on the PC and insert the CD-ROM in the reader.

The CD-ROM will automatically launch a main menu on the screen.

2 Choose **Install Vision iQ** from the list.

The install wizard will appear and enable Vision iQ to be installed to the hard disk of the PC. Once installed, an icon will be placed on the Windows® desktop and Vision iQ placed in the Windows® desktop Startup Program option.

Note:

The Vision iQ password is reset to its default state by the installation process. The default password is: **Vision** and is case sensitive.

2.5 InterChange iQ 2000 and 2000plus Installation

This procedure installs the initial configuration for the unit and checks that the operational software is operating correctly.

On completion of the self-test the Loader Module is invoked. It consists of:

- an Application Flash Check module, and
- a Download module.

The Application Flash Check module checks the Application Flash for the presence of a Protocol Application Module.

If a Protocol Application Module is present in the Application Flash it is copied into DRAM and executed.

If a Protocol Application Module is not present, the Download module is copied into DRAM and executed. The protocol application software must then be downloaded before proceeding.

The Protocol Application Module consists of:

- A Configuration module
- An Operation module comprising:
  - A Protocol module
  - An Online Management module

You have to enter a number of commands to configure the unit. In the examples that follow, InterChange iQ 2000 output is shown indented, your required inputs are **highlighted**. At the end of each input press <**Enter**>**.**

Further information on using the configuration system is contained in *Section 6.2*. First:

1 Make sure no ISDN cables are connected to the unit.

2 Make sure the unit is powered on and self-test has completed successfully.

3 Connect the PC to the Management port and run Vision iQ.

To enter Vision iQ and the Configuration Wizard, refer to *Section 4.6 Configuring Vision iQ for use with InterChange iQ 2000 units* .

2.5.1 Set Factory Default Values

Set the configuration to the factory default values. Type:

Select Configuration Option? **RSET** <**Enter**>

The factory default values are reset. The following message is re-displayed:

Select Configuration Option?

2.5.2 Set Time and Date

Set the correct time and date by entering the following sequence:

Select configuration option ? **TIME** <**Enter**>

Configure Time and Date

Time Configuration option? **TIME** <**Enter**>

You are prompted to enter the date and time. Follow the prompts and enter appropriately. Set the seconds value a little into the future as the time is not set immediately. When complete, the following is displayed:

Time Configuration option?

To check your input, type:

Time Configuration option? **VIEW** <**Enter**>

The time and date is displayed.

Save the new time and date information to the battery-backed clock. Type:

Time Configuration option? **SET** <**Enter**>

Exit from this menu. Type:

Time Configuration option? **EXIT** <**Enter**>

You are returned to the higher menu level.

The default values and correct time and date are now set and you are ready to proceed with protocol configuration.

2.5.3 Protocol Configuration

The menu displays:

Select Configuration Option?

To change the management connection from direct/remote via modem to ethernet, the user needs to configure the InterChange iQ 2000 or iQ 2000plus **Console**. Type:

CONS <Enter>

The Configuration Wizard asks for the console parameter:

Configure which console parameter ?

To list the menu of available parameters, type:

? <Enter>

To display the present configuration, type:

DISP <Enter>

The present configuration is shown:

console is over serial
BAUD rate: 38400
Flow Control: XON/XOFF

To change the configuration, type:

CONF <Enter>

The Configuration Wizard asks:

Console type ?

Type:

ETH <Enter> for Ethernet or

SER for Serial

For Ethernet, the Configuration Wizard then asks:

IP address ?

This is an address for the unit, which the user must obtain and make a note of, from the network administrator. The format of the address (and the default) is 0.0.0.0.

After typing in the address, the Configuration Wizard asks:

Subnet mask ?

Again, this is an address for the unit, which the user must obtain (and make a note of), from the network administrator. The format of the address (and the default gateway) is 0.0.0.0. After typing in the address, the Configuration Wizard asks:

Configure which console parameter ?

Type: **EXIT <Enter>**

This will return the user to the main configuration menu:

select **Configure which configuration option ?**

2.5.4 Configuration using the Quick Start wizard

To display the top-level menu, type:

? <Enter>

The Configuration Wizard then offers the user a choice of available configuration options.

To display the Quick Start menu, type:

QUICK <Enter>

This takes the user to the option menu for the Quick Start wizard and allows the user to set up a basic configuration. Answer the questions as prompted.

For more information on the Configuration Wizard, see *Section 4.13*.

2.5.5 Configuration changes (for manual changes to the default settings)

To set up an advanced configuration, at the top level menu, type:

ADV <Enter>.

Change the values in each menu where the default values are incorrect for your applications. Further tips and details of use of this system are provided in the discussion in *Section 6.2*.

The menu leads you through the options. If you have no changes to make, skip to the next step. To list the options available type:

? <Enter>

in response to any prompt.

To return to the level above, type:

EXIT <Enter>

When you have completed the changes to the default parameters and are back to the top level menu, type:

Select Configuration Option? **EXIT <Enter>**

The program exits from the menu, saves the new parameter settings into non-volatile memory, then activates the operational code.

2.6 Cabling into a Management System

This section explains how to connect the InterChange iQ 2000 and iQ 2000plus into a Management System via the alarm relay outputs.

2.6.1 Alarm Signal Cabling

Prepare and route an alarm cable to the left hand side of the cabinet (viewed from the rear) (refer to *Figure 4*). Connect the cable to the 3-way Weidmuller ALARM connector at the rear of the first InterChange iQ 2000 unit. Lock in place.

Connect the cable to an Alarm Panel or alarm signal detector at the remote end.

2.6.2 Alarm Signal Cable Test

Leave the unit powered on with no ISDN cables connected. This causes an alarm condition which is notified by the alarm detection equipment.

If no alarm condition is notified then correct the cabling.

2.6.3 Management Terminal Cabling

InterChange iQ 2000 units are normally run with an in-situ management terminal. Where it is required, route the prepared Management Terminal cable to the left hand side of the unit, connect to the D-9 outlet labelled Management on the rear of the unit (refer to *Figure 4*), and lock in place. If the InterChange iQ 2000 or iQ 2000plus is to be managed via the Ethernet, the user should supply a suitable cable (cat. 5 UTP patch cable) with a RJ45 connector at the InterChange iQ 2000 unit end for connection to the user Ethernet connection.

Connect the cable to a PC or to a remote PC via a modem or the Ethernet.

2.6.4 Management Terminal Cable Connection Test

Turn on the unit and the remote terminal. Make sure that the terminal communications parameters are set up correctly, as specified in *Appendix C*. Let the self-tests complete and the unit enter operation. From the management terminal, enter any management command and check that the correct response is returned.

If the correct response is not returned then corre§ct the management cable.

Leave the unit switched on for the next test.

2.7 Network Cabling

This section explains how to connect an InterChange iQ 2000 unit into the ISDN.

Warning:

Before attaching ISDN cables, perform any power-on configuration which may be required to make the signalling conversion fit the particular application. Failure to do so may cause unexpected effects on the remote equipment when the InterChange iQ 2000 unit is connected.

2.7.1 Port Usage

At the rear of the unit are two pairs of BNC connectors (75 Ohm) marked Rx and TX, and two RJ45 connectors (120 Ohm). There is a switch marked 75 Ohm and 120 Ohm for changing between the connectors. PORT 1 and PORT 2 are indicated on the rear.

Port 1 presents a Q931 Protocol variant and Port 2 presents DPNSS. The exact parameters of each protocol are configured through the off-line menus.

The sense of each connection can be changed by configuration.

2.7.2 Cabling Practice

Specimen drawings for BNC and RJ45 plug terminations will be provided on request.

Label all cables, especially 75 Ohm coax pairs, during installation. Labelling greatly eases any trouble shooting or subsequent reconnection/re-configuration of the units.

Attach the label to each cable in an easy to read location indicating the InterChange equipment (if there is more than one), the port it connects and its direction. For example:

1/1 TX (Q.931)

1/1 RX (Q.931)

1/2 TX (DPNSS)

1/2 RX DPNSS)

Depending on the installation, labelling may be beneficial at either or both ends of each cable.

2.7.3 Cabling Procedure

Connect to the appropriate connectors at the rear of the unit.

When connecting cables to a live unit, connect the pair of cables attaching to Customer Premises Equipment (CPE, e.g. PBX) before connecting to the remote network, particularly if this is a public service network.

Cable continuity can be checked by applying a physical loop, TX to RX, at the attached equipment.

Warning:

When applying loopbacks, assert the public network loop before the private equipment loop, and remove the loops in reverse order. Failure to observe this precaution may lead to excessive port error reports and the link being put spuriously out of service.

Remove the loopbacks (see the notes above on the order of removal) and connect to the remote equipment.

Network cabling is now complete.

3 Switches and LEDs

This chapter describes:

- Operation of the switches on the rear panel
- The information provided by the LEDs on the unit front panel

During normal operation of the unit the LEDs indicate its operational status. This information is particularly useful in diagnosing cabling faults and external equipment problems, during both installation and normal running.

3.1 Switches

3.1.1 Power ON/OFF switch

The power ON/OFF switch is located on the rear panel adjacent to the mains connector. It switches mains electricity to the Universal Input Power Supply Unit.

3.1.2 Sync switch

The Sync switch allows the unit clock source to be synchronised to either of the primary ports (P1 or P2). It is located on the rear panel between the Alarm connector and the Ethernet connector. The selection must be made before power is applied to the unit.

Ideally, the Sync switch should be set to whichever port is connected to the network so that the unit is synchronised with a central clock source rather than the clock source of another unit. However, in a Packet Switched Network the synchronisation should come from the PBX.

3.1.3 Port Impedance switches

The Port 1 and Port 2 impedance switches allow the selection of either 75W or 120W impedance to be made. They are located adjacent to the Port 1 and Port 2 connectors on the rear panel. The selection should be made before power is applied to the unit.

3.2 Front Panel LEDs

The unit has 10 LEDs on its front panel. During the self test sequence, and in the event of an alarm, they show unit status information.

3.2.1 Status LEDs

There are 4 red Status LEDs; S3,S2,S1 and S0. They indicate unit status in conjunction with the two port LEDs, P1 and P2. During unit self-test, the status LEDs will come on and go off in sequence and in the event of a self-test failure, stop with one LED remaining on.

3.2.2 LAN LEDs

Three LEDs indicate LAN activity. A red TxD LED comes on when if data is being transmitted; A red RxD LED comes on if data is being received and a green Link LED comes on if the connection is OK. If Ethernet is not connected, these LEDs will be off.

Note:

The RxD LED will flash for any data on the Ethernet, regardless of destination.

3.2.3 Port LEDs

There are two red Port LEDs, P1 and P2. Together with the Status LEDs, they indicate unit status. When the unit is operating correctly, these LEDs ripple, with all status LEDs off.

When a problem exists, the Port LEDs will show its location (P1 or P2, or if both P1 and P2 are lit, a major alarm exists). The status LEDs will then indicate the problem (refer to *7.4.3*). If more than one has a problem, they will be shown in a cycle of five seconds each.

3.2.4 Power LED

The Power LED has two functions. When power is applied, it comes on orange to indicate the unit is in self-test mode. When the self-test has been satisfactorily completed, it changes to green to indicate the unit is functioning correctly.

4 Management using Vision iQ

4.1 Configuration

The InterChange iQ 2000 and iQ 2000plus units are managed locally, via modem or via the Ethernet using the management ports and Vision iQ. The ports are situated on the back of the unit.

Vision iQ runs on an attached PC and provides the features to:

- transfer applications into the FLASH memory in the InterChange iQ 2000 unit, and
- configure and monitor the application.

4.2 Upgrade Configuration Procedure

This is a quick guide to installing the upgrade protocol software that allows you to connect to and configure an InterChange iQ 2000 or iQ 2000plus. The procedure is only required for upgrades to the InterChange iQ 2000 or iQ 2000plus unit:

1 Install the Vision iQ software on your PC.

2 Connect your host PC to the InterChange iQ 2000 unit, using a modem link or Ethernet connection if working remotely, or a serial link if working locally.

3 Run Vision iQ to:

- install the InterChange iQ software on the InterChange unit, using the Download application, and
- configure the application.

4.3 Software Components

An InterChange iQ 2000 unit requires the following:

- Vision iQ software (run on the attached PC).
- Application software (run on the InterChange iQ 2000).
- The Vision iQ User Guide (supplied on CD-ROM).

4.4 PC to InterChange Connection

4.4.1 Serial Link

For local access, connect your PC to the InterChange iQ 2000 or iQ 2000plus unit. Attach one end of the management cable to one of the serial ports at the rear of your PC, attach the other end to the Management Port on the InterChange iQ 2000 or iQ 2000plus unit.

4.4.2 Ethernet Connection

For remote access via the Ethernet, a RJ45 connector is provided on the back of the InterChange iQ 2000 unit. This allows connections over TCP/IP (Winsock 2) working over a LAN, WAN and the Internet.

4.4.3 PC Specification

Your PC must be an IBM compatible computer with, as a minimum:

- Pentium 166 processor (Pentium II 450 MHz minimum for call trace),
- 32 Mb of main memory (64 Mb for Windows® NT),
- 200 Mb hard disc,
- A colour S-VGA monitor (screen resolutions of 800 x 600),
- A mouse or other pointing device,
- Keyboard standard or enhanced,
- 3.5 inch disk drive,
- CD-ROM drive,
- At least one free serial port or an internal modem card, and
- Microsoft Windows® 95/98 or NT 4.

4.5 Software Installation

Note:

Windows® NT users must have administrator user rights to install Vision iQ.

Follow this procedure to install Vision iQ:

1 Start Windows® on the PC and insert the CD-ROM in the reader.

The CD-ROM will automatically launch a main menu on the screen.

2 Choose '**Install Vision iQ**' from the list.

The install wizard will appear and enable Vision iQ to be installed to the hard disk of the PC. Once installed, an icon will be placed on the Windows® desktop and Vision iQ placed in the Windows® desktop Startup Program option.

Note:

The Vision iQ password is reset to its default state by the installation process. The default password is:

Vision

and is case sensitive.

4.6 Configuring Vision iQ for use with InterChange iQ 2000 units

4.6.1 Starting Vision iQ

Double click the **Vision iQ** icon or select Vision iQ from the Windows® desktop Startup Program option. Vision iQ briefly displays its title dialogue and then displays the main window:

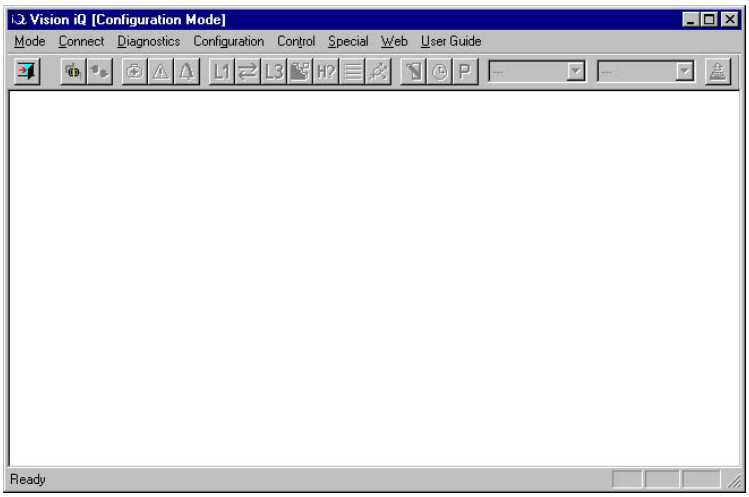

Figure 6: The Vision iQ Main Window.

The main window contains eight menu options:

- Mode
- Connect
- Diagnostics
- Configuration
- Control
- Special
- Web
- User Guide

4.6.2 Working with Vision iQ

To start working with Vision iQ use the Connect option to connect to the InterChange unit.

Once connected you can choose to monitor the unit activity or configure the ports to your requirements.

To monitor the unit activity, enter the **Mode** option and select **Monitor Mode**. This is the default mode when Vision iQ is run and does not allow any configuration of the shelf to be undertaken.

To configure the unit, enter the **Mode** option and select **Configuration Mode**, which is password protected.

Use the Special, Password option to change the password. The user should make a note of any new password. The default password is **Vision**, which is case sensitive. Enter the password and press **OK**. The configuration icons become un-greyed.

You are now ready to use Vision iQ to download application software to your InterChange iQ 2000 or iQ 2000plus unit and to manage its configuration.

4.6.3 Vision iQ Mode Options

The Mode menu contains two options:

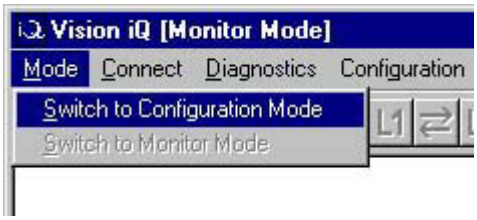

Figure 7: Vision iQ Mode Options.

Switch to Configuration Mode (*Figure 7*) which allows full configuration and monitoring facilities. Configuration mode is normally password protected.

Switch to Monitor Mode which allows access to a number of functions in read-only mode. This is the default mode when Vision iQ is first installed.

Configuration Mode

Select **Switch to Configuration Mode**. You are asked to enter your password.

Figure 8: Password Dialogue Box.

You are strongly recommended to change your password immediately after installing Vision iQ. If the password is lost the only way to regain access to Vision iQ configuration facilities, is to re-install Vision iQ.

The configuration mode allows you to set up and access shelf definitions, do global polls and access the configuration Wizard.

Monitor Mode

Monitor mode allows you monitor the status of the shelf but not to change any of the configuration. There is no password protection of this mode.

The available monitoring options available to you are:

- Connect - Disconnect and Reconnect.
- Diagnostics - Overview, Major Alarms, Port Errors and Call Statistics.

4.7 Connect

Note:

Although the InterChange iQ 2000 is a self contained unit, during configuration, it is referred to as a ‘shelf’.

The **Connect** menu allows you to connect to an InterChange iQ 2000, disconnect from and reconnect, and create and modify shelf definitions.

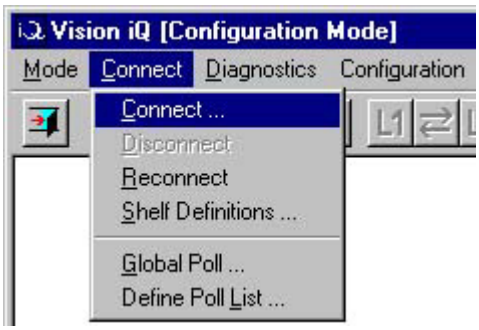

Figure 9: The Vision iQ Connect Menu.

4.7.1 Connection

Choose **Connect** or **Reconnect** to connect to one of the predefined target Interchange iQ systems. **Reconnect** re-establishes contact with the last target system connected to by Vision iQ

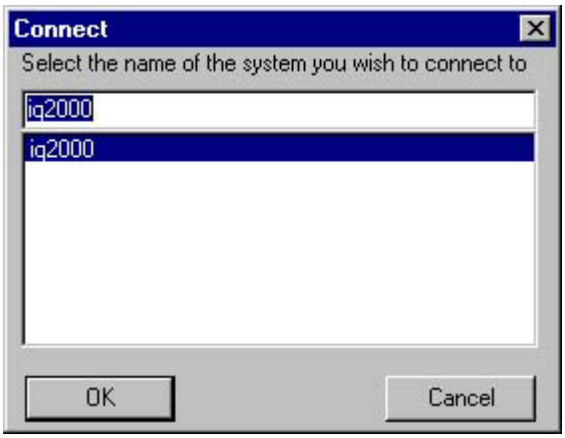

Figure 10: Vision iQ Connect Menu.

From the pull down menu (Figure 10), select the system required for connection to and press **OK** or double click. Vision iQ connects to the target system.

If an invalid shelf name is selected, the user is informed and the connection process terminates. Restart the connection and use the correct shelf name.

A connecting dialogue is displayed, showing the status as the connection proceeds. This is particularly useful when connecting remotely via a modem. Any modem failure is reported during this procedure. When connected, the Vision iQ title bar changes to show the title of the selected shelf definition. The icon buttons are enabled.

The **Connect** and **Shelf Definitions** options are disabled and the **Disconnect**, **Reconnect** and **Define Poll List** options become available.

The **Diagnostics**, **Configuration**, **Control** and **Special** menus also become available.

4.7.2 Disconnect

This option is only available when connected to a target system.

When **Disconnect** is selected, Vision iQ disconnects from the currently connected system. A disconnect dialogue is displayed showing the status as disconnection proceeds.

When disconnected, the **Diagnostics**, **Configuration** and **Special** options are greyed and the **Connect** and **Shelf Definitions** options are re-enabled.

4.7.3 Reconnect

Choose **Reconnect** to connect to the last shelf connected to, or if currently connected, to disconnect and reconnect to the predefined target Interchange iQ systems. See *Section 4.7.4 Shelf Definitions* on how to create a definition of a target InterChange iQ system. **Reconnect** re-establishes contact with the last target system connected to by Vision iQ.

When connected, the Vision iQ title bar changes to show the title of the connected shelf. The icon buttons are enabled for whichever mode preceded disconnection.

The **Connect** and **Shelf Definitions** options are disabled and the **Disconnect** and **Reconnect** options become available.

4.7.4 Shelf Definitions

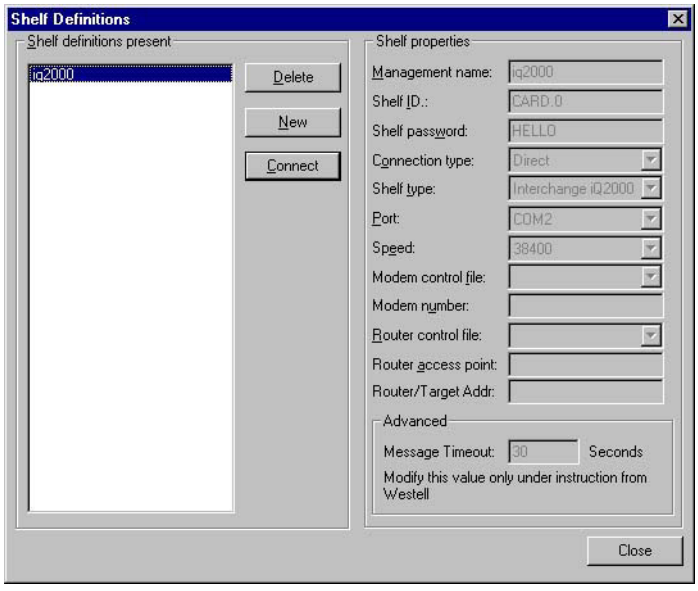

Figure 11: Shelf Definitions Dialogue Box.

This dialogue allows the user to:

- Delete a shelf definition.
- Create a new shelf definition.
- View properties of existing shelf definitions.
- Connect to a shelf.

4.7.5 Shelf Properties Group

When this option is first selected, the **Shelf Properties** group contains the properties of the selected definition. The group is greyed to indicate read only. When **New** is selected from the **Shelf Definitions** Present group, the properties of the new shelf are entered here.

The functions of the fields in the **Shelf Properties** group are described below:

Field	Action
Management name:	Enter the name allocated to the shelf.
Shelf ID.:	Enter the shelf identification. This id consists of one letter followed by three alphaneumeric characters, followed by a full stop and up to two digits; for example "CARD.0". Zero is not recognised as a leading digit.
Shelf password:	Enter the shelf password. Make a note of the password for future reference - the default password is "HELLO".
Connection type:	Select Direct, network or Remote connection.
Shelf type:	Select the shelf type from the pull down menu (i.e. iQ2000).
Port:	Select which PC port to use for the connection, if applicable.
Speed:	Select the modem speed. 38400 baud is mandatory, if applicable.
Modem control file:	Select the modem control file you wish to use to make a remote connection.
Modem number:	Enter the telephone number of the modem.
Router control file:	Select the router control file you wish to use.
Router access point:	Enter an ASCII string to denote the access point.
Router/Target Addr:	Enter an IP address in dotted decimal notation fro the route on shelf as applicable.

4.7.6 Shelf Definitions Present Group

This box presents a list of existing shelf (or unit) definitions. The first definition in the list is selected (see Figure 11).

Delete button

Press the **Delete** button to delete the currently selected shelf definition from the configuration file.

New Button

Press the **New** button to add a new shelf definition to the configuration file. The **Delete** button is greyed and the text on the **New** button reads **<<Add**. The **Shelf Properties** group is cleared and un-greyed allowing the to enter the properties of the new shelf definition.

Ensure that all the fields have been completed before continuing the process.

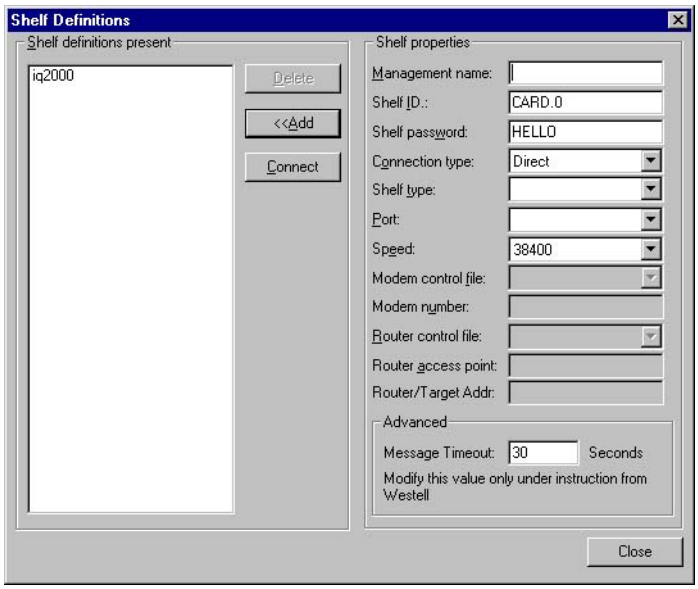

Figure 12: Shelf Definitions Present.

When the **<<Add** button is pressed, the definition is validated and, if valid, added to the list and selected. The button text is set to **New**, the **Delete** button is un-greyed and the **Shelf Properties** are greyed to read only.

Connect button

This button works in two ways:

- In **New** mode, connection is made to the currently selected definition
- In **<<Add** mode:
  - The data in the **Shelf Properties** fields are validated
  - The definition is added to the configuration file
  - An attempt is made to connect to the new definition.

If the connection is unsuccessful the definition is deleted from the configuration file, a message box is displayed and the **Shelf Properties** fields are made available for editing.

Close button

Press the **Close** button to cancel any new definition and to end the dialogue.

4.7.7 Define Poll List

The **Define Poll List** allows a list of shelves to be defined for global status polling.

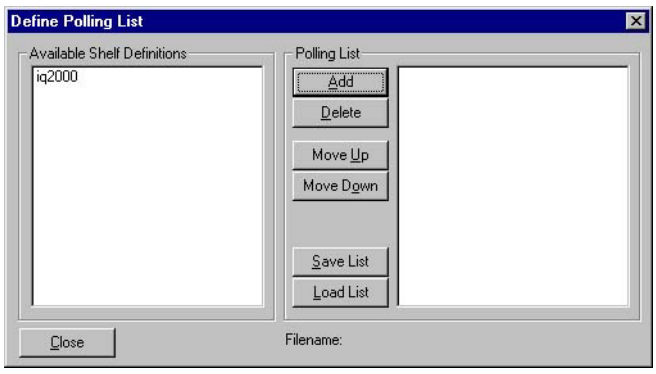

Figure 13: Define Poll List Dialogue.

The poll, when executed, is carried out sequentially through the list. When the end of the list is reached, it restarts from the beginning.

The **Define Poll List** dialogue allows the user to:

- Add a shelf to the list.
  Select the shelf name in the **Available Shelf Definitions** box and press the **Add** button
- Delete a shelf from the list.
  Select the shelf name in the **Polling List** box and press the **Delete** button.
- Move a shelf up the list.
  Select the shelf name in the **Polling List** box and press the **Move Up** button
- Move a shelf down the list.
  Select the shelf name in the **Polling List** box and press the **Move Down** button
- Load previously saved polling list.
  Press the **Load** button and enter the file-name of the polling list
- Save a polling list.
  Press the **Save** button and enter the file-name you wish to save the list in.

When the **Polling List** has been defined, press **Close** to return to the main menu.

4.7.8 Global Poll

This option is only available when disconnected from a target system.

When **Global Poll** is selected, the **Select Polling List** dialogue is displayed.

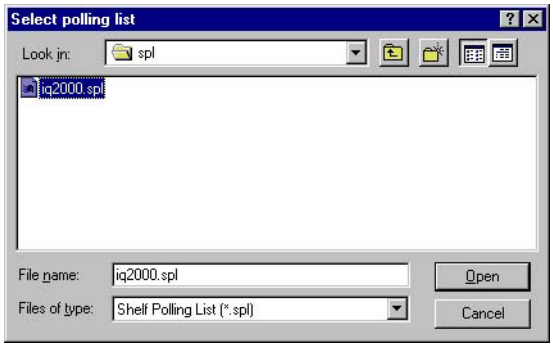

Figure 14: Select Polling List Dialogue.

Select the required **Polling List** you wish to use and press the **Open** button.

The **Polling View** window (*Figure 15*) displays the polling list name and the date of the last good poll. A [**+**] indicates there is more information available. To display this information, click the [**+**] with the left mouse button. To connect to the selected shelf, click on the right mouse button and press the **Connect to Target** button.

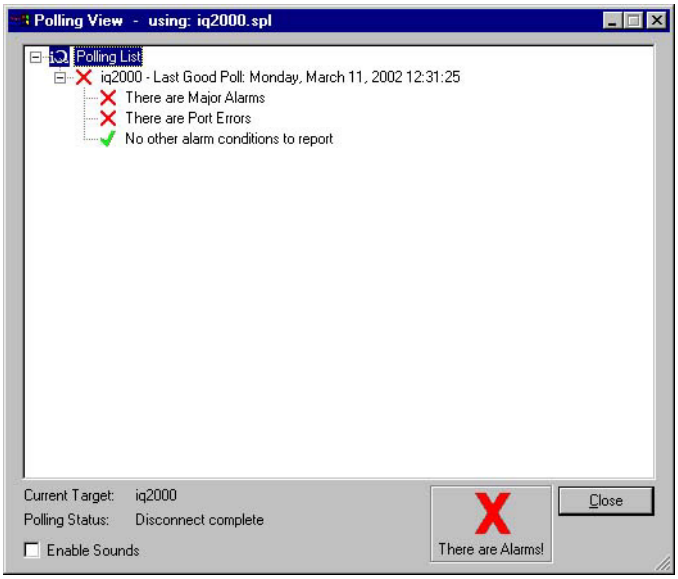
Polling View - using: iq2000.spl
Polling List
iq2000 - Last Good Poll: Monday, March 11, 2002 12:31:25
There are Major Alarms
There are Port Errors
No other alarm conditions to report
Current Target: iq2000
Polling Status: Disconnect complete
Enable Sounds
There are Alarms!
Close

Figure 15: Polling View Window.

A red **X** displayed next to the polling list name and at the bottom of the window indicates that there are alarm errors present on the shelf.

Tick the **Enable Sounds** box if an audible notification of alarms is required.

Status information provided for InterChange iQ 2000 shelves is for **Major Alarms**, **Port Errors** and **Power Supply Failure**.

4.8 Diagnostics

The Diagnostics menu allows the user to overview the whole Interchange system module by module, retrieve and display the **Major Alarms** log, and retrieve and display the **Port Errors** log. The display differs for different InterChange iQ products.

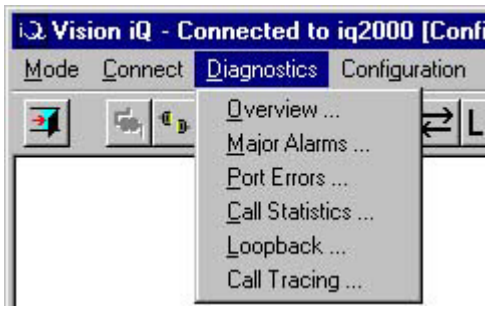

Figure 16: The Diagnostics Menu.

Vision iQ also allows the user to retrieve and display call statistics and perform a loopback test on the shelf.

4.8.1 Diagnostics Overview

The Diagnostics option (Figure 16) is only available when Vision iQ is connected to a target system.

Select the **Overview** option to display the main diagnostics dialogue:

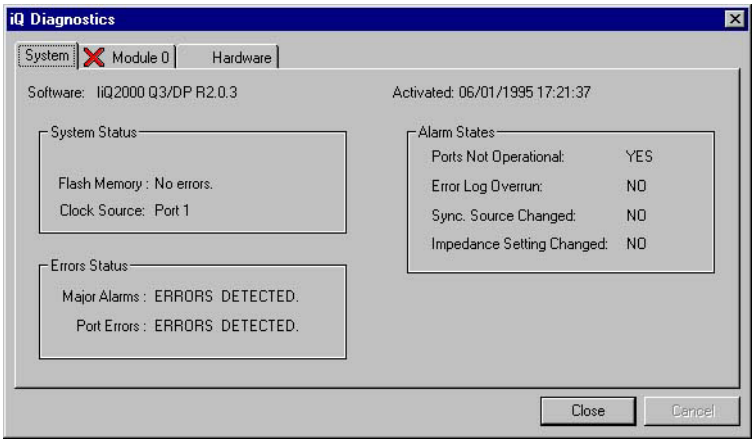

Figure 17: The Diagnostics System Window.

The dialogue contains one tab page for System information, one for the Module and one for the Hardware. Each page contains status information about that particular module. An overview icon is displayed on each tab showing the overall state of the module even when the particular page is not being viewed. Vision iQ also dynamically changes the icon on each of the module tabs to indicate the current status of the module.

The icons are listed below in order of precedence, highest first:

- Red Cross: an error exists on the module or the module is decommissioned
- Green Tick: no error conditions exist on the module
- No Icon: module is not present

The dialogue is updated in near real-time by notification messages from the target system.

4.8.2 System Page

There is always a **System** page on the dialogue, as shown in (Figure 17) above. It contains information about the software installed, the system status, errors status and alarm states.

4.8.3 Module Page

The **Module** page (Figure 18) displays different information, depending upon the status of the module.

Port Protocol

The **Module** page lists each port and displays the protocol that those ports are set to. If the module is physically absent, install a new module. Use the **Control** option from the main menu to commission the module.

Layer 1 windows show the status of the port and have a pull-down list which show the details of the port.

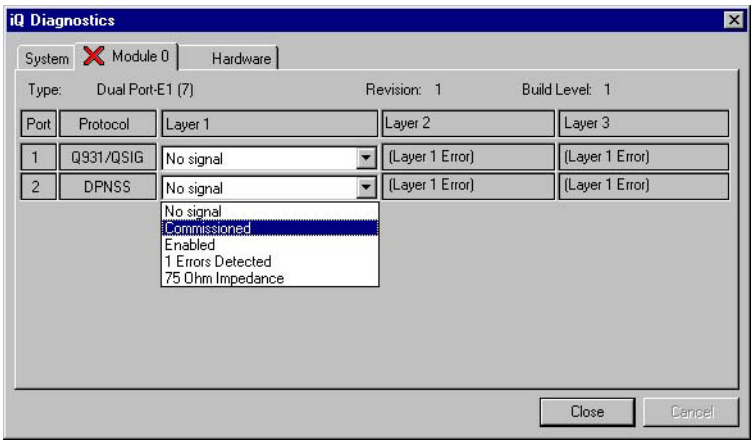

Figure 18: Diagnostics Module Page.

Layer 2 windows show the status of the layer and reports any problems with Layer 1.

Layer 3 windows show the status of the layer and reports problems with Layers 1 or 2.

4.8.4 Hardware Page

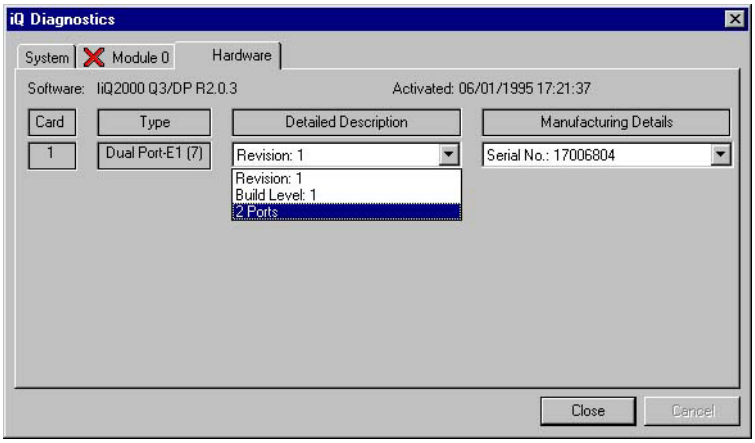

Figure 19: Diagnostics Hardware Page.

The dialogue box shown in *Figure 19* gives a detailed description of the hardware and the manufacturing details of the unit.

4.9 Major Alarms

The Major Alarm function allows the user to retrieve and display the major alarm log from the selected shelf:

Note:

This also displays the **Reset** Log, which cannot be cleared.

Figure 20: The Major Alarms Dialogue.

The buttons allow the user to:

- **Clear** the log from the shelf.
- **Print** the log on a local or network printer.
- **Save** Log to a file-name with a .LOG extension, stored in the computer. The default path for .LOG files is:

  C:\PROGRAM\DOWNLOAD\LOGS.

The user is asked to supply a file-name for the target file.

- **Append** the log to an existing file. The user is asked to supply a file-name for the target file.
- **Close** the function and return to the main menu.

4.10 Port Errors

Select the module and the port numbers from the tool bar and press **OK**. The Port Error log is retrieved from the unit and displayed:

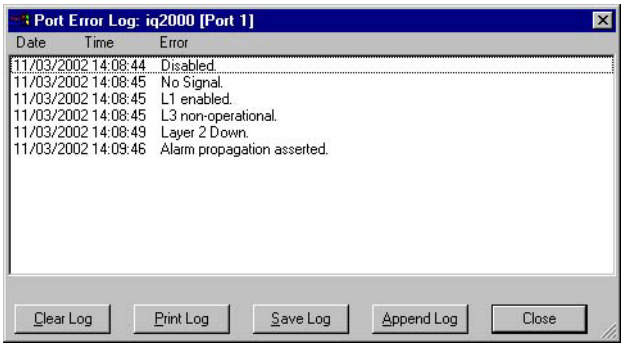

Figure 21: Port Errors Log.

The buttons allow the user to:

- **Clear** the log from the shelf.
- **Print** the log on a local or network printer.
- **Save** Log to a file-name with a .LOG extension, stored in the computer. The default path for .LOG files is:

  C:\PROGRAM\DOWNLOAD\LOGS

- **Append** the log to an existing file.
- **Close** the function and return to the main menu.

4.11 Call Statistics

Call Statistics gives the user a display of statistics for calls and errors. These can be displayed for the shelf, a module or a port.

Press the [**+**] to open the display for the required target.

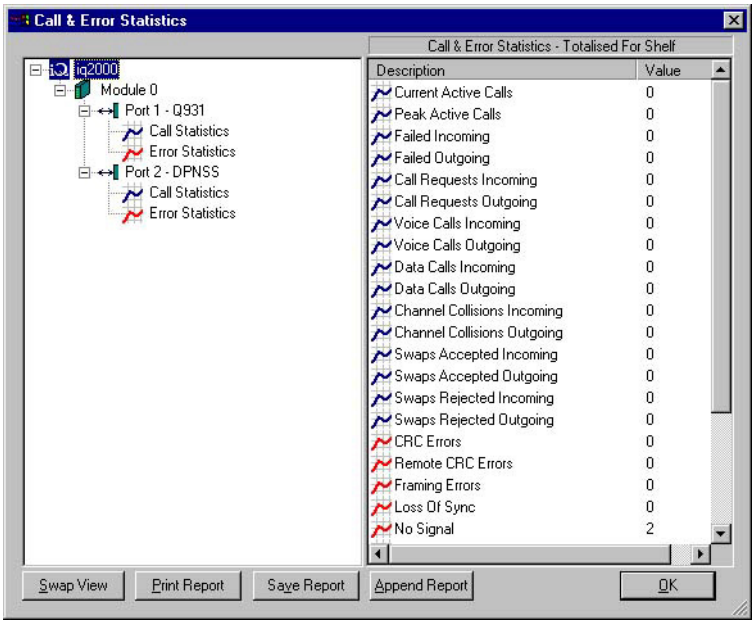

Figure 22: Call Error Statistics Dialogue.

Right-clicking on [**+**] of the shelf displays the options **Update All** and **Reset All**.

Right-clicking on [**+**] of a module displays the options **Update Module Statistics** and **Reset Module Statistics**.

Right-clicking on [**+**] of a port displays the options **Update Port Statistics** and **Reset Port Statistics**.

Right-clicking on [**+**] of **Call Statistics** displays the options **Update Call Statistics** and **Reset Call Statistics**.

Right-clicking on [**+**] of **Error Statistics** displays the options **Update Error Statistics** and **Reset Error Statistics**.

4.12 Loopback

To verify the integrity of the transmit/receive circuit, place a logical or physical Loopback plug on the back of the shelf or on the remote end of the connection wire. Select Remote Loopback and press Set.

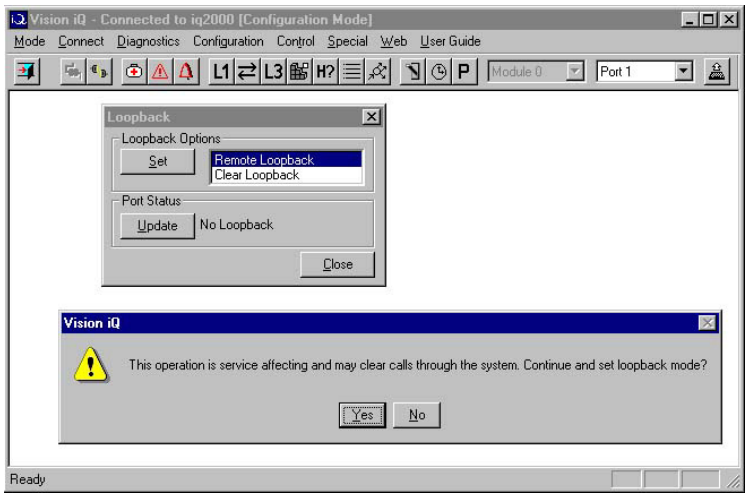

Figure 23: Loopback Verification.

The user is warned that the loopback test can affect service and is asked for confirmation to continue. To clear the loopback, select **Clear Loopback** and press the **Set** button. A warning dialogue will ask you to remove the physical loobback if preset. Press **OK** and the loopback dialogue will change to **No Loopback**.

4.13 Using the Configuration Wizard

Configuration of the InterChange iQ 2000 and iQ 2000plus is selected via the **Configuration** menu:

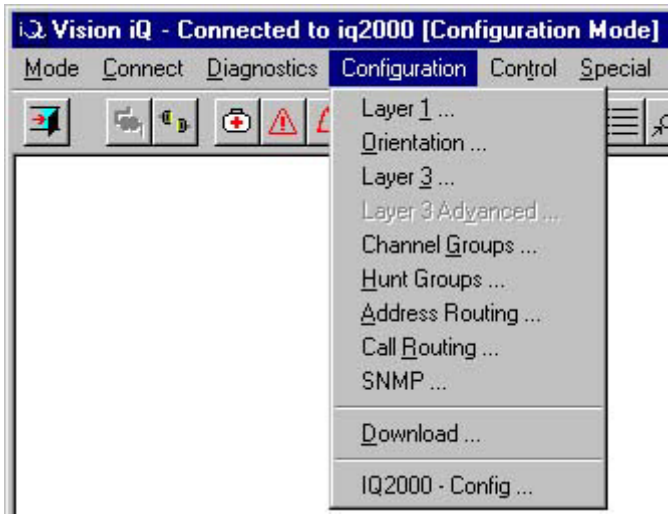

Figure 24: InterChange iQ Configuration Menu.

Selecting **iQ 2000 Config...** will take the user to the **InterChange iQ 2000 Configuration Menu** Window. Before entering the InterChange iQ 2000 Configuration menu system a warning screen is displayed.

Vision iQ
This operation is service affecting and may reset the product. Continue and enter offline configuration?
Yes
No

Figure 25: Configuration Warning Screen

Selecting **YES** from this window will disconnect the InterChange iQ 2000 from the network and connect it to the off-line configuration main menu.

If connecting to the unit via a serial connection, the menu window will start immediately and display the results of the units self-test cycle. When this has completed, press **Return** as indicated

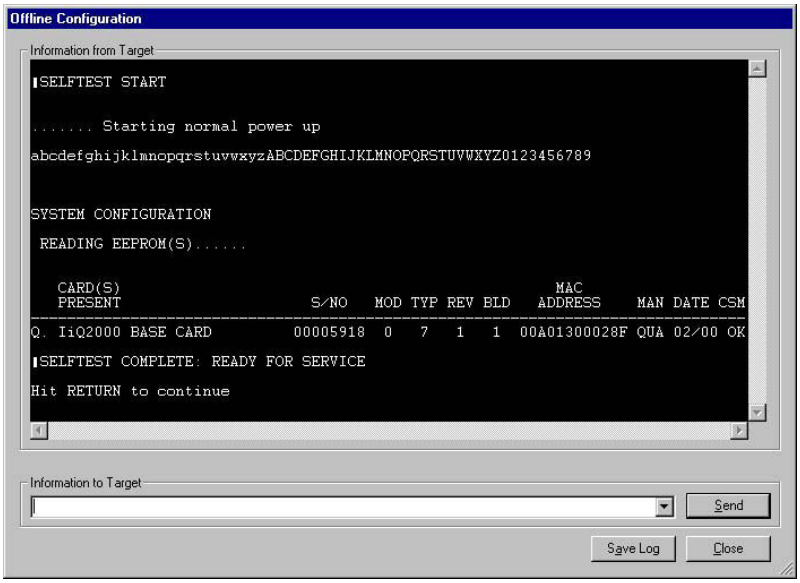

Figure 26: Offline Configuration Window.

On hitting **Return**, the user is requested to wait while the configuration loads.

If the connection to the unit is made over Ethernet, all of the above is hidden. When the window opens, a dialog appears informing the user that the system is waiting for information.

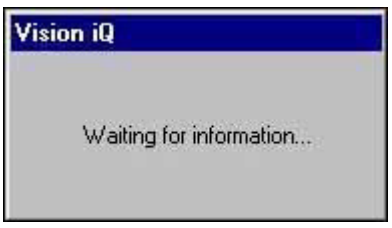

Figure 27: Waiting for Information Dialogue Box.

Once the configuration has been loaded, the following screen will be displayed, regardless of the method of connection. The menu header will display whether the unit is an InterChange iQ 2000 or an iQ 2000plus.

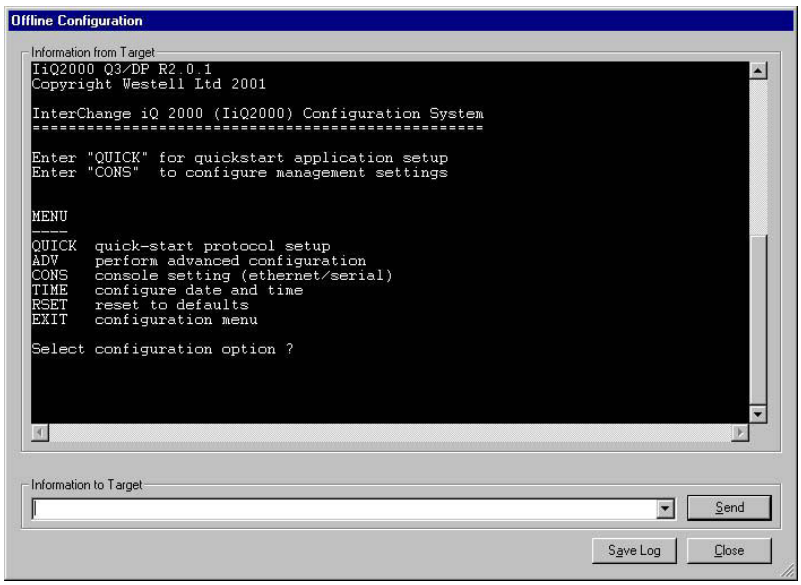

Figure 28: Main Configuration Menu.

This is the main Configuration menu. When entering your choice, throughout the menu system, type in the word at the start of the line (e.g. **TIME**) in upper case and then press **Return**. At any stage, typing '**?**' will present the available options.

To configure the main aspects of the InterChange system, the user will need to run the Quick Start protocol setup. Type **QUICK** to continue.

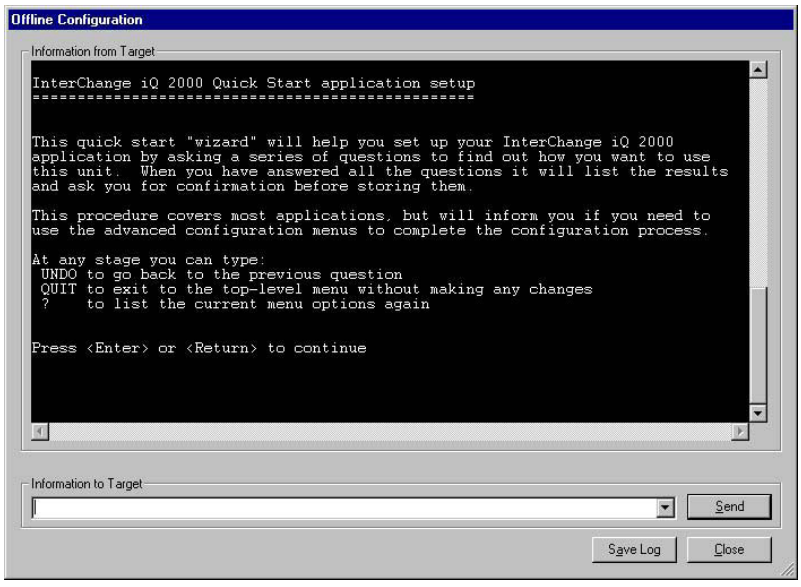
Offline Configuration
Information from Target
InterChange iQ 2000 Quick Start application setup
This quick start "wizard" will help you set up your InterChange iQ 2000
application by asking a series of questions to find out how you want to use
this unit. When you have answered all the questions it will list the results
and ask you for confirmation before storing them.
This procedure covers most applications, but will inform you if you need to
use the advanced configuration menus to complete the configuration process.
At any stage you can type:
UNDO to go back to the previous question
QUIT to exit to the top-level menu without making any changes
? to list the current menu options again
Press <Enter> or <Return> to continue
Information to Target
Send
Save Log
Close

Figure 29: The Quick Start Protocol Setup Screen.

While in the Quick Start configuration system, the commands **UNDO** and **QUIT** can be used to aid navigation. **UNDO** will always take you back to the immediately preceding question, **QUIT** will leave the Quick Start system without saving the responses made so far, and return you to the Main Menu prompt.

Note that the changes made within the Quick Start system are not committed until the Menu System is exited. Press **Return**, as instructed, to start the Quick Start system.

Note: The following figures illustrate one path through the Quick Start configuration system for an InterChange iQ 2000 unit. Different answers to any question may well result in subsequent questions being altered, left out or added.

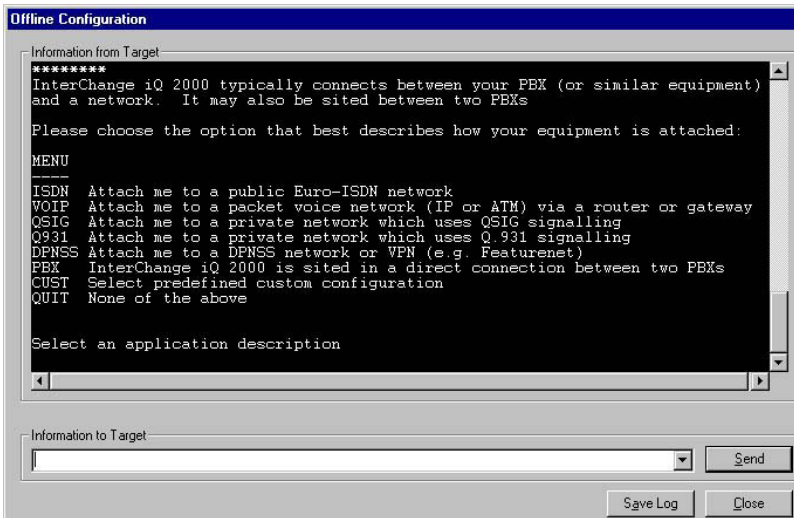
Offline Configuration
Information from Target
****
InterChange iQ 2000 typically connects between your PBX (or similar equipment)
and a network. It may also be sited between two PBXs
Please choose the option that best describes how your equipment is attached:
MENU
ISDN Attach me to a public Euro-ISDN network
VOIP Attach me to a packet voice network (IP or ATM) via a router or gateway
QSIG Attach me to a private network which uses QSIG signalling
Q931 Attach me to a private network which uses Q.931 signalling
DPNSS Attach me to a DPNSS network or VPN (e.g. Featurenet)
PBX InterChange iQ 2000 is sited in a direct connection between two PBXs
CUST Select predefined custom configuration
QUIT None of the above
Select an application description
Information to Target
Send
Save Log
Close

Figure 30: Quick Start System Screen 1.

You first need to describe the basic Application of the InterChange iQ 2000. This is discussed in *Section 1.1*. Knowing the intended purpose for the system will make it easier to target subsequent questions to determine the necessary usage.

Note: If the unit is attached to a Cisco Call Manager, an Avaya Definity or a Nortel Networks Meridian PBX, you will first need to select **CUST**, choose from the menu and explain how your DNSS PBX is configured, or identify the network's link level orientation.

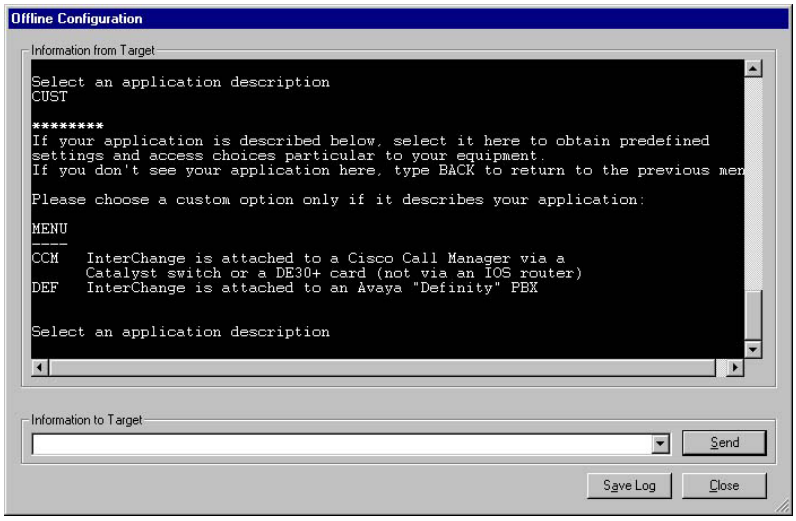
Offline Configuration
Information from Target
Select an application description
CUST
****
If your application is described below, select it here to obtain predefined
settings and access choices particular to your equipment.
If you don't see your application here, type BACK to return to the previous men
Please choose a custom option only if it describes your application:
MENU
CCM InterChange is attached to a Cisco Call Manager via a
Catalyst switch or a DE30+ card (not via an IOS router)
DEF InterChange is attached to an Avaya "Definity" PBX
Select an application description
Information to Target
Send
Save Log
Close

Figure 31: The Quick Start System CUST Menu for an InterChange iQ 2000.

Note: If the unit is an InterChange iQ 2000plus, an additional menu item will be displayed. Please refer to *Section 4.14 InterChange iQ 2000plus Enhancements*.

If **CUST** is not applicable, the following screens show by example how to configure an InterChange iQ 2000 unit.

For the sake of this example, we assume that an InterChange iQ 2000 is connected between a DPNSS switch and a router with a suitable QSIG port. This most closely matches the **VOIP** option, so that is entered.

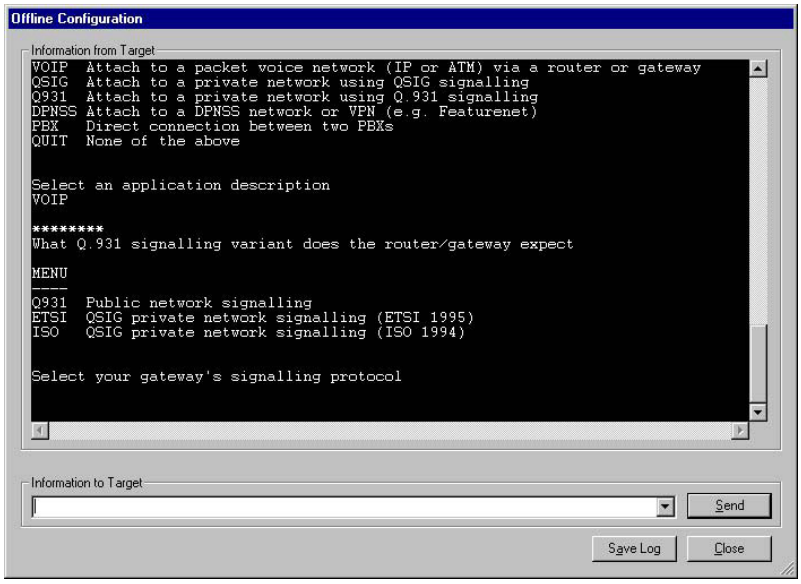
Offline Configuration
Information from Target
VOIP Attach to a packet voice network (IP or ATM) via a router or gateway
QSIG Attach to a private network using QSIG signalling
Q931 Attach to a private network using Q.931 signalling
DPNSS Attach to a DPNSS network or VPN (e.g. Featurenet)
PBX Direct connection between two PBXs
QUIT None of the above
Select an application description
VOIP
****
What Q.931 signalling variant does the router/gateway expect
MENU
Q931 Public network signalling
ETSI QSIG private network signalling (ETSI 1995)
ISO QSIG private network signalling (ISO 1994)
Select your gateway's signalling protocol
Information to Target
Send
Save Log
Close

Figure 32: Quick Start System Screen 2.

You will need to know what protocol the router is expecting to be connected to; the QSIG port. This will need to be checked in the router's User Guide and/or Configuration - we assume for this example that it's **ISO**.

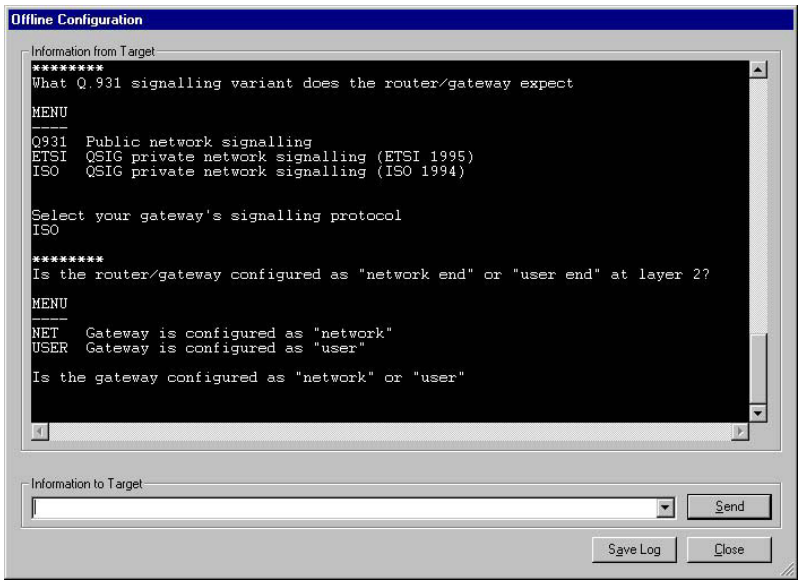
Offline Configuration
Information from Target
****
What Q.931 signalling variant does the router/gateway expect
MENU
Q931 Public network signalling
ETSI QSIG private network signalling (ETSI 1995)
ISO QSIG private network signalling (ISO 1994)
Select your gateway's signalling protocol
ISO
****
Is the router/gateway configured as "network end" or "user end" at layer 2?
MENU
NET Gateway is configured as "network"
USER Gateway is configured as "user"
Is the gateway configured as "network" or "user"
Information to Target
Send
Save Log
Close

Figure 33: Quick Start System Screen 3.

Another aspect of the router's QSIG port we will need to know is the 'orientation' of its **Layer 2**. In this instance we assume **USER**.

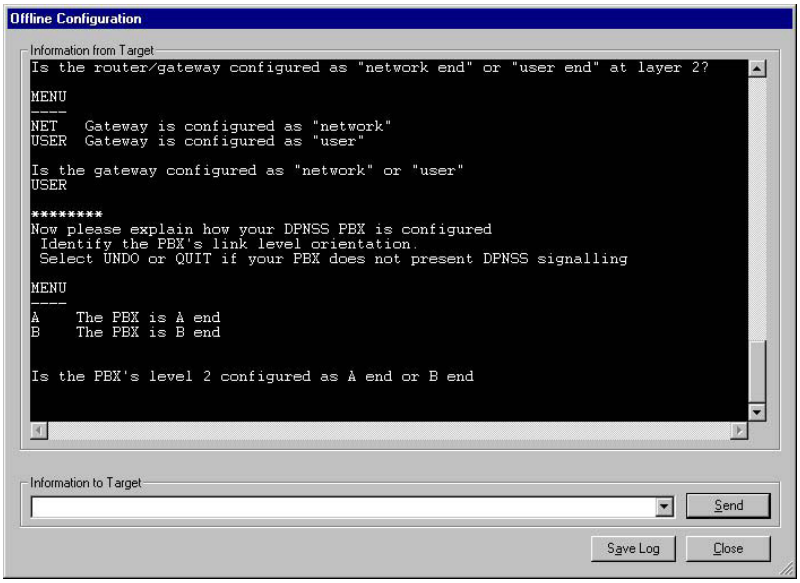
Offline Configuration
Information from Target
Is the router/gateway configured as "network end" or "user end" at layer 2?
MENU
NET Gateway is configured as "network"
USER Gateway is configured as "user"
Is the gateway configured as "network" or "user"
USER
****
Now please explain how your DPNSS PBX is configured
Identify the PBX's link level orientation.
Select UNDO or QUIT if your PBX does not present DPNSS signalling
MENU
A The PBX is A end
B The PBX is B end
Is the PBX's level 2 configured as A end or B end
Information to Target
Send
Save Log
Close

Figure 34: Quick Start System Screen 4.

We also need to know an orientation for the DPNSS PBX. This will be set in the configuration of the PBX. We assume for the example that the PBX is set as **A** end.

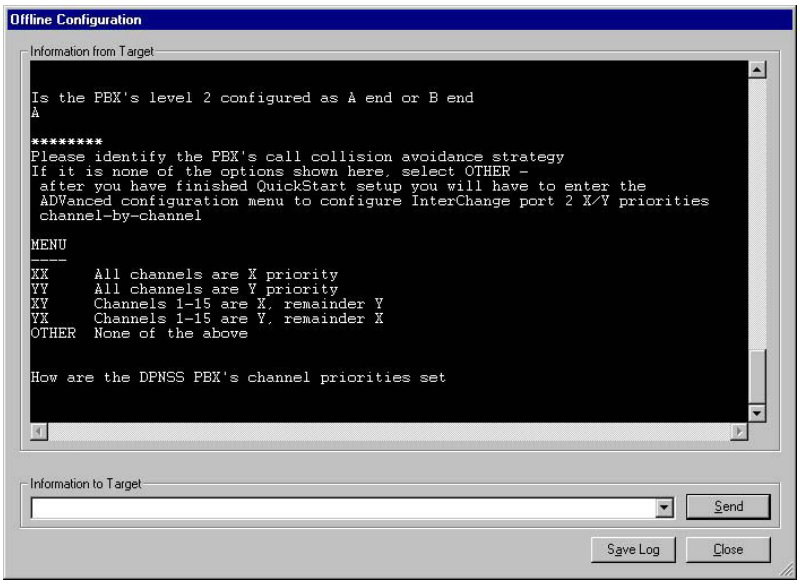
Offline Configuration
Information from Target
Is the PBX's level 2 configured as A end or B end
A
****
Please identify the PBX's call collision avoidance strategy
If it is none of the options shown here, select OTHER -
after you have finished QuickStart setup you will have to enter the
ADVanced configuration menu to configure InterChange port 2 X/Y priorities
channel-by-channel
MENU
XX All channels are X priority
YY All channels are Y priority
XY Channels 1-15 are X, remainder Y
YX Channels 1-15 are Y, remainder X
OTHER None of the above
How are the DPNSS PBX's channel priorities set
Information to Target
Send
Save Log
Close

Figure 35: Quick Start System Screen 5.

Another DPNSS PBX setting will be the channel orientation, which is used for contention avoidance. This is configured on a per-channel basis. You are offered the four most likely choices plus **OTHER**. If **OTHER** is selected, you will need to use the **Advanced Configuration** Menus, once the Quick Start system has completed.

Our example PBX is set to **XY**.

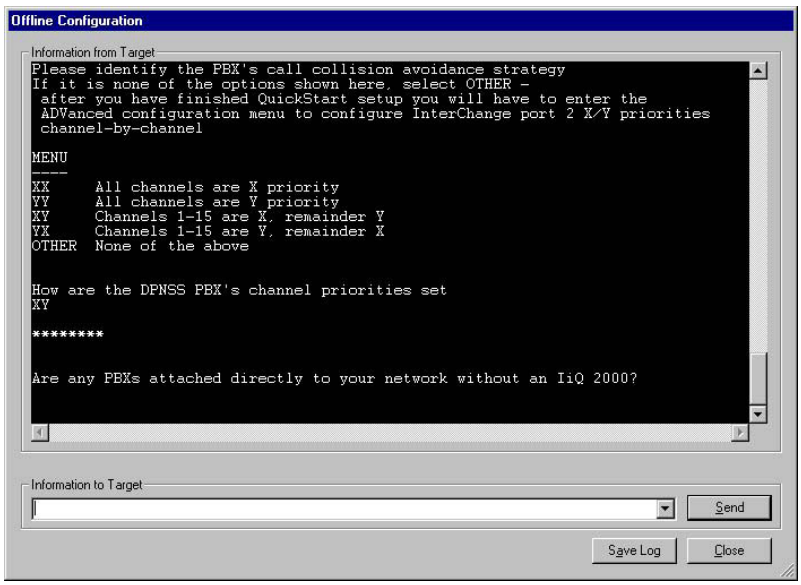
Offline Configuration
Information from Target
Please identify the PBX's call collision avoidance strategy
If it is none of the options shown here, select OTHER -
after you have finished QuickStart setup you will have to enter the
ADVanced configuration menu to configure InterChange port 2 X/Y priorities
channel-by-channel
MENU
XX All channels are X priority
YY All channels are Y priority
XY Channels 1-15 are X, remainder Y
YX Channels 1-15 are Y, remainder X
OTHER None of the above
How are the DPNSS PBX's channel priorities set
XY
****
Are any PBXs attached directly to your network without an IiQ 2000?
Information to Target
Send
Save Log
Close

Figure 36: Quick Start System Screen 6.

It is possible that some QSIG PBXs connect directly to a router without going through an InterChange iQ2000. We need to know this to determine the best method of signalling to the other PBXs. As this is a simple yes/no question, the options are not presented. For the example, we will say **YES**, there is a QSIG PBX connected to one of the routers.

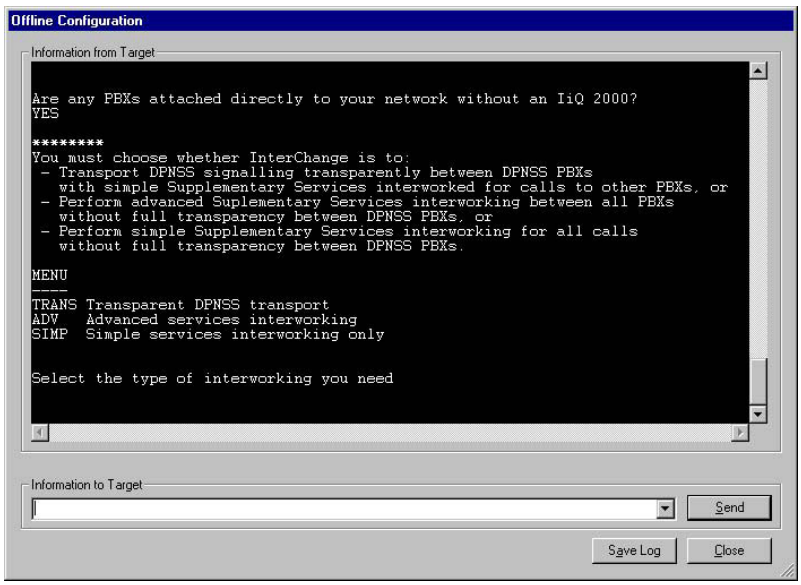
Offline Configuration
Information from Target
Are any PBXs attached directly to your network without an IiQ 2000?
YES
****
You must choose whether InterChange is to:
- Transport DPNSS signalling transparently between DPNSS PBXs
with simple Supplementary Services interworked for calls to other PBXs, or
- Perform advanced Suplementary Services interworking between all PBXs
without full transparency between DPNSS PBXs, or
- Perform simple Supplementary Services interworking for all calls
without full transparency between DPNSS PBXs.
MENU
TRANS Transparent DPNSS transport
ADV Advanced services interworking
SIMP Simple services interworking only
Select the type of interworking you need
Information to Target
Send
Save Log
Close

Figure 37: Quick Start System Screen 7.

You will now be offered the methods of interworking that are appropriate to the configuration. **TRANS** will select a transparent mode of signalling where the InterChange iQ 2000 will package the full DPNSS message within a QSIG message for a second InterChange unit to unpack it and reconstruct the original message in full.

However, if the message arrives at a QSIG PBX it will be treated as a simple call, and no extensions will be understood. To get a system to interwork between DPNSS and QSIG PBXs you will need to select **ADV**, which will provide an advanced service interworking. Here DPNSS signalling is attempted to be mapped into a QSIG equivalent and vice versa. If all you need is for the ability to make calls, select **SIMP**. This will perform a basic translation of the normal call services. For further discussion on Transparency and Conversion, see *Section 5*. For demonstration purposes, **ADV** is selected.

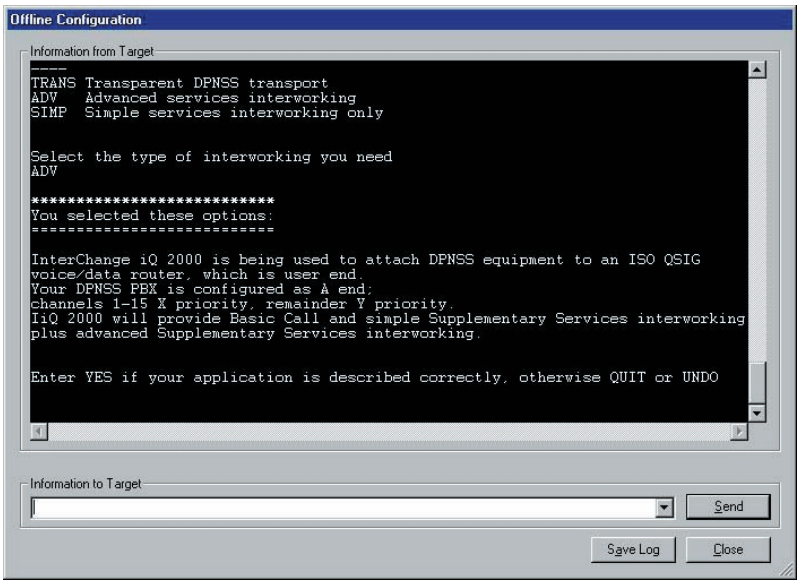
Offline Configuration
Information from Target
TRANS Transparent DPNSS transport
ADV Advanced services interworking
SIMP Simple services interworking only
Select the type of interworking you need
ADV
****
You selected these options:
==========
InterChange iQ 2000 is being used to attach DPNSS equipment to an ISO QSIG voice/data router, which is user end.
Your DPNSS PBX is configured as A end;
channels 1-15 X priority, remainder Y priority.
IiQ 2000 will provide Basic Call and simple Supplementary Services interworking plus advanced Supplementary Services interworking.
Enter YES if your application is described correctly, otherwise QUIT or UNDO
Information to Target
Send
Save Log
Close

Figure 38: Quick Start System Screen 8.

If you selected **ADV** there is one further detailed technical question to answer:

> **You have selected full (advanced) interworking.**
> **InterChange iQ 2000 can occasionally persuade the network to achieve more effective call routing by issuing a 'ROP-INV' request to the DPNSS PBX. ROP-INV was a late addition to the DPNSS specification, so not all DPNSS PBXs support this request and it can prevent some of those PBXs from achieving correct Route Optimisation. You may need to ask your PBX supplier, or experiment to determine whether your PBX accepts this string.**
>
> **If not, you must answer NO, but if it does, we recommend you answer YES.**
>
> **Do(es) the DPNSS PBX(s) attached via this unit support ROP-INV?**

No calls will fail, whichever way you answer this question. But if you are in any doubt about the ability of your DPNSS PBX(s) to handle ROP-INV you should answer **NO**, because correctly operating Route Optimisation without ROP-INV is better than incorrect operation if the PBX does object to InterChange's use of this signalling.

The Quick Start system has now discovered everything it needs to configure the unit, but before continuing, it confirms the choices that have been made. If you wish to amend your selections, either enter **UNDO** to go back a question, or **NO** to restart the Quick Start system. If happy with the answers given, select **YES**.

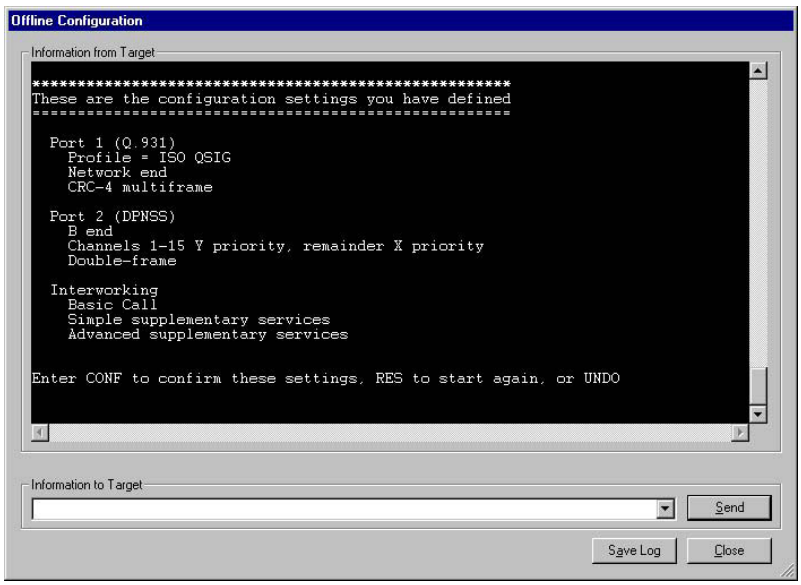

Figure 39: Quick Start System Screen 9.

On confirming the responses given, the InterChange iQ 2000 will display the configuration it has determined. These will often be different to the responses given. To continue and store this configuration type **CONF**. Alternatively type **RES** to restart the Quick Start system, or **UNDO** to back up to the last question asked.

On typing **CONF**, the system will take a few moments to file the new configuration into the database before returning to the top-level menu prompt. If it determines that the Clock Synchronisation Switch (on the rear of the unit) may be in the wrong position, a warning will be given, as in Figure 40.

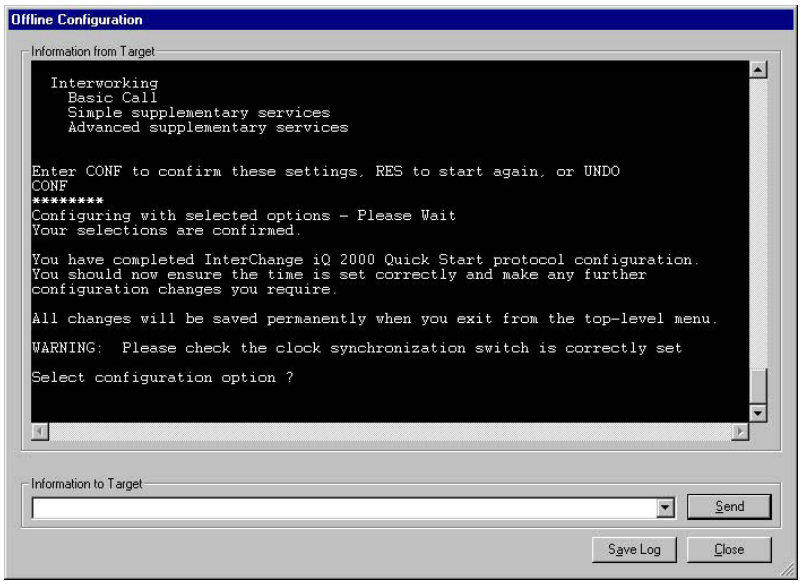
Offline Configuration
Information from Target
Interworking
Basic Call
Simple supplementary services
Advanced supplementary services
Enter CONF to confirm these settings, RES to start again, or UNDO
CONF
****
Configuring with selected options - Please Wait
Your selections are confirmed.
You have completed InterChange iQ 2000 Quick Start protocol configuration.
You should now ensure the time is set correctly and make any further
configuration changes you require.
All changes will be saved permanently when you exit from the top-level menu.
WARNING: Please check the clock synchronization switch is correctly set
Select configuration option ?
Information to Target
Send
Save Log
Close

Figure 40: Quick Start System Screen 10.

At this prompt, either select **EXIT** to leave the configuration system and return to operational mode, or you can set the console and protocol options (See *Section 2.5* for further details).

4.14 InterChange iQ 2000plus Enhancements

The InterChange iQ 2000plus is distinguishable from the InterChange iQ 2000 by its additional support of call handling features, intended to supplement the internetworking capabilities of the PBXs attached. These additional features are briefly described below.

4.14.1 Proxy Diversion

Some Q.931/QSIG PBXs do not support call diversion. InterChange iQ 2000plus can be configured to attempt the diversion call on behalf of the calling PBX. This is done by clearing the original (diverted) call and then attempting a new call to the extension to which the call is to be diverted. However, the success of the procedure depends on whether the DPNSS network will route the call correctly.

In order for the InterChange iQ 2000plus to perform diversion on behalf of the Q.931/QSIG PBX, it is forced to break strict compliance with the DPNSS Diversion Service. To minimise equipment congestion, the proxy diversion re-uses the same outgoing DPNSS channel and drops the original call before attempting the diverted call.

4.14.2 Redirection Timeout

Operator Redirection applies, in particular, to calls incoming to the DPNSS Operator that have been transferred to IP 'phones. The application ensures that if the wanted party does not answer, the Operator is prompted to break in on the call and ask the caller whether they wish to continue to hold, or try an alternative number. In the case of continuing to hold, enough information has been provided back to the Operator Station for the call to be reconnected to the wanted number by a single key push.

This dialogue is only encountered if proxy diversion has been enabled. It is self-explanatory;

> **InterChange** iQ 2000 **can redirect calls transferred by the DPNSS operator back to the operator if they are not answered.**
>
> **Do you require InterChange to perform operator redirection?**

If you answer **YES** you will have to set a timer value:

> **We need to know the number of seconds to let a transferred call ring out before InterChange attempts to redirect it to the operator. This must be a time long enough to allow the user to answer but shorter than the ringing cut-off timer in the calling PBX or network. You may want to consider whether to set the timeout shorter than any divert-on-no-reply timer that might run at the called PBX.**
>
> **How long shall InterChange wait before redirecting [5 .. 60 secs] :**

Set the timeout, as directed. If you decide not proceed with configuring Operator Redirection at this point you can either type **UNDO** or set a timeout value of **0**, in which case cancellation will be confirmed by the comment:

> **Operator redirection support will not be enabled.**

4.14.3 Q.932 Redirecting Number Information

The InterChange iQ 2000plus is configurable so that when DPNSS signals a diverting call, the number information is returned to permit messages to be left in the original number voice mail system mailbox.

Specifically, this facility can be used with Cisco Call Manager delivering Q.931 signalling to the InterChange iQ 2000plus.

4.14.4 CCM Message Waiting Indication

Full integration of a Cisco Call Manager cluster into a DPNSS based VMS requires a signal that calls are waiting to the CCM controlled telephones.

The numbers that are configured in the CCM Configure Services Parameters must also be configured into the InterChange iQ 2000plus using the CCM options in the **CUST**om menu via **QUICK**start in the Vision iQ management application.

4.14.5 Configuration Wizard Variation

If an InterChange iQ 2000plus unit is attached to a Cisco Call Manager, an Avaya Definity or a Nortel Networks Meridian PBX and you select **CUST** in the Vision iQ **QUICK**start menu, the following screen will be presented.

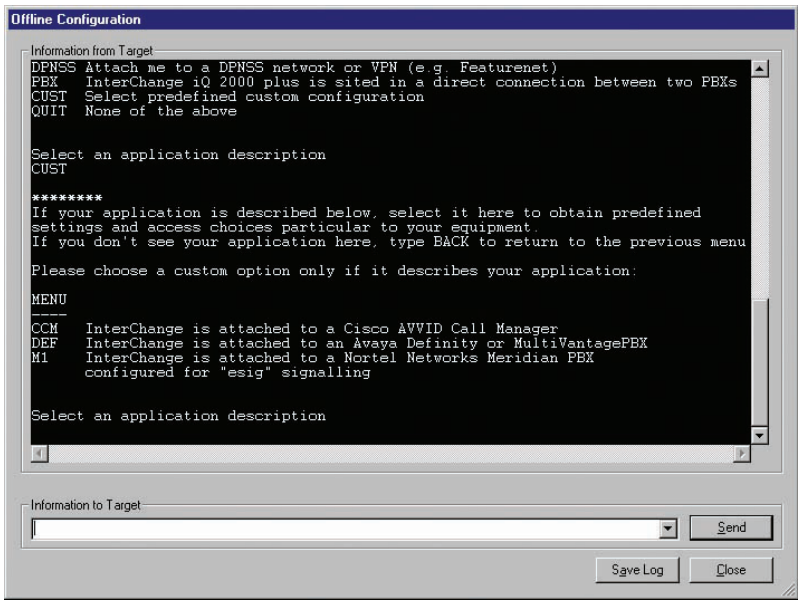
Offline Configuration
Information from Target
DPNSS Attach me to a DPNSS network or VPN (e.g. Featurenet)
PBX InterChange iQ 2000 plus is sited in a direct connection between two PBXs
CUST Select predefined custom configuration
QUIT None of the above
Select an application description
CUST
****
If your application is described below, select it here to obtain predefined settings and access choices particular to your equipment.
If you don't see your application here, type BACK to return to the previous menu
Please choose a custom option only if it describes your application:
MENU
CCM InterChange is attached to a Cisco AVVID Call Manager
DEF InterChange is attached to an Avaya Definity or MultiVantagePBX
M1 InterChange is attached to a Nortel Networks Meridian PBX
configured for "esig" signalling
Select an application description
Information to Target
Send
Save Log
Close

Figure 41: The Quick Start System CUST menu for an InterChange iQ 2000plus.

The addition of **M1** in the menu allows configuration parameters for the Nortel Networks Meridian to be entered before proceeding to the **VOIP** options.

All **CUST** sub menu variations for the InterChange iQ 2000plus accommodate configuration of the Proxy Diversion, Number Redirection and Message Waiting features described above.

5 Conversions and Transparency

5.1 Q.931/DPNSS Conversion

5.1.1 Default Configuration

The conversion is pre-programmed for DPNSS Transparent usage of a QSIG network.

G.704: Q.931 port set to ISO CRC-4 multiframe mode, DPNSS port set to Double Frame mode

DPNSS: DPNSS support on port 2: configured at Level 2 as A end, and at Level 3 as 30 channels, all X end.

Service Options: CLI/OLI/TLI ENABLED
BSS-M/BSS-P ENABLED
NAE ENABLED
Transparency END POINT

Q.931: Q.931 support on port 1: ISO QSIG
Layer 2 initial window size = 7
Configured at Layers 2 and 3 as USER end
Full overlap signalling support BOTHWAYS
Switch Q.931 call to lowest free channel to resolve contention.

Service Options: CLI/OLI/TLI ENABLED
SUB ADDRESS ENABLED
Transparency END POINT & TRANSIT

5.1.2 Configuration Options

The clock source is configured to select the Q.931 port by a switch on the rear of the unit. The Q.931 ports can be configured to operate without CRC-4 checking (double frame operation).

The DPNSS port can be subconfigured for fewer than 30 channels. Q.931 usage is restricted to the same channels.

At the Link Layer the Q.931 port can be configured to clear calls when a Physical Layer fault is notified or to disregard such faults, relying on Layer 3 mechanisms to validate the status of active calls. Calls are cleared on notification of a DPNSS Physical Layer fault.

The DPNSS port can be configured at Level 2 to be either **A** or **B** oriented. If the attached DPNSS equipment is **A** then the port must be configured as **B**, and vice versa.

Each DPNSS channel (timeslot) can be independently configured to be either **X** or **Y** oriented. For channels configured on the attached DPNSS equipment to **X** then the InterChange iQ 2000 channel must be configured as **Y** and vice versa.

Note:

In filling out worksheets, an InterChange iQ 2000 unit is configured by timeslots, numbered 1 to 15, 17 to 31, whereas most DPNSS PBXs are configured by channels numbered 1 to 30.

Q.931 profile support can be configured on a port basis. The default profile is ISO QSIG (ETS 300 172). Standard alternatives are:

- ETSI
- EURO ISDN

The differences between the ETSI and Euro-ISDN profiles are explained in *Section 6.4.4*. Network end working of the public access protocols and many hybrid variants can readily be configured. Contact your supplier for advice on any specific requirement.

The interface IDs for the two ports are configurable.

InterChange iQ 2000 configured with overlap signalling disabled assumes that all SETUP messages from attached Q.931 equipment are complete. It interpolates a SENDING COMPLETE element, even if none is provided, and sends ISRM(C) to DPNSS while returning CALL PROCEEDING to the Q.931 equipment.

Where the Q.931 equipment does support overlap signalling, this function can be fully enabled within InterChange iQ 2000. SETUP from Q.931 without SENDING COMPLETE causes an ISRM(I) message to be generated to the DPNSS side, and a SETUP ACKNOWLEDGE message to be returned to the Q.931 equipment.

InterChange iQ 2000 units use a mandatory channel identification for calls from DPNSS into Q.931. If the proposed channel number is not acceptable to the Q.931 equipment the DPNSS call is rejected. If it receives concurrent incoming calls contending for the same physical channel from both DPNSS and Q.931 ports InterChange iQ 2000 attempts to resolve the channel contention, provided the Q.931 equipment has used preferred channel identification, by proposing an alternative free channel for the incoming Q.931 call. Otherwise, one of the calls fails. For best results, configure the Q.931 equipment to favour the lowest free channel first for outgoing calls, and then configure InterChange iQ 2000 unit to select the highest free channel to offer in the event of contention, or vice versa.

Warning:

Failure to set a Q.931 or DPNSS port to the correct framing mode or to set DPNSS level 2 orientation appropriately prevents calls from operating correctly.

Although the DPNSS service support level is configurable, normally all options are turned on.

5.2 Transparent Signalling

5.2.1 Overview

The InterChange iQ 2000 and iQ 2000plus platform software allows end to end transparent signalling between DPNSS PBXs via an Intervening QSIG Network

DPNSS over QSIG Transparency allows call control and supplementary service signalling to be carried from a DPNSS network via an intervening network providing QSIG signalling interfaces to another DPNSS network. The intervening network and Interchange units simulate a single transit mode in a DPNSS network.

For transparency over QSIG the DPNSS conversion uses the QSIG Generic Functional Protocol (GFP) for the transport of DPNSS signalling. GFP provides a framework within which communicating InterChange iQ 2000s can exchange manufacturer specific information without causing problems in the intervening equipment. To support DPNSS services involving virtual call signalling, the QSIG network must also support call-indpendent signalling connections (sometimes called temporary signaling connections).

Figure 42: DPNSS over QSIG Transparency.

The figure above shows how, once the DPNSS call leaves the InterChange iQ 2000 unit, the transit across the intervening network is handled entirely by that network. It is not necessary for the DPNSS PBX to provide information about the call further than the InterChange.

The routing functions of the central network remain fully available, so transparent signalling can be effected between any number of Interchange-connected attached PBXs.

When calls arrive at a non-Interchange-connected PBX then the normal DPNSS/ Q.931 conversion functionality of an InterChange iQ 2000 or iQ 2000plus applies, as described in *Section 5.1*, plus a limited number of further Supplementary Services.

5.2.2 Supported Services

InterChange iQ 2000 and iQ 2000plus provide transparency for:

- Basic Call BTNR 188 [Ref. B.24] Sections 6 and 7.
- Supplementary Services BTNR 188 [Ref. B.24] Sections 8 - 26, 28-48 with the exception that options within some services which use Single Channel Working are not supported.
- BTNR 188 Section 27 applies to Traffic Channel maintenance services between adjacent DPNSS PBXs and is inappropriate for the intervening QSIG network.

5.3 Interworking Between DPNSS & QSIG Equipment

When the non-DPNSS equipment or network supports Q.931 signalling, InterChange iQ 2000 provides Basic Call interworking with a only minimum of services: Calling/Called Number presentation, Calling Number Restriction, Called Number Subaddress, and Call Transfer (no number updates).

However, with some constraints caused by irreconcilable differences between the signalling models, all InterChange IQ 2000 and InterChange iQ 2000plus systems can be configured to inter-operate the following Supplementary Services between DPNSS and QSIG equipment:

DPNSS	**QSIG**
OLI/CLI	Calling/Called/Connected Number Presentation
NPR-A	Calling Number Presentation Restriction
NAE	Called Party Subaddress
Text (Name)	Name Identity
Calling Line Category (plus call progress signalling)	Party Category (ETSI QSIG) (plus Call Progress and Party Number Type-of-Number indications)
Call Offer - Call Offer - Do Not Disturb Override	Call Offer Path Reservation and non-Path-Reservation variants are both supported Do Not Disturb Protection Levels
Loop Avoidance	Transit Count
Diversion - Immediate - Busy - No Reply - Diversion Validation	Call Forward - Unconditional (CFU) - on Busy (CFB) - on No Reply (CFNR) - Check Restriction (If this service is not supported in QSIG InterChange will adsorb the DPNSS signalling and provide an automatic positive response)
3-Party Services - ENQuiry Call - HOLD - Transfer	 - Signalling adsorbed by InterChange - Remote Notification - AnnouncedTransfer - Unannounced (Blind) Transfer
Route Optimisation	Path Replacement
Call-Back (1) - Call Back When Free - Call Back When Next Used	Call Completion - to Busy Subscriber (CCBS) - on No Reply (CCNR)

DPNSS	QSIG
Message Waiting [2] - Call Back Messaging - Manufacturer proprietary signalling	Message Waiting Indication
Remote Registration and Cancellation of Diversion - Immediate - Busy - No Reply - Combined	Activate/Deactivate Diversion - Unconditional - On Busy - On No Reply - All of the above

Where necessary, these service mappings can be enabled and modified individually.

Notes:

[1] DPNSS PBX routing configurations may need to be modified where the PBX has more than one interface to the QSIG PBX or network

[2] There is no explicit message Waiting Indication Service in DPNSS. InterChange iQ 2000 systems support mappings to the standard DPNSS Call Back Messaging service, as used by Mitel and some Philips PBXs, and to proprietary signalling used by Ericsson, and Siemens (also Nortel) PBXs. Alternative proprietary signalling extensions can be configured as necessary.

InterChange iQ 2000 and InterChange iQ 2000plus systems can be configured to support various QSIG profiles and variants, including ECMA/ETSI (1993), ISO (1995) and ISO-aligned ETSI (1997), a superset of ISO signalling. These systems do not support ETSI QSIG segmentation, as this is not required for DPNSS interworking.

5.4 IiQ 2000plus Proxy Interworking Between DPNSS & Q.931

Using its 'proxy' interworking features, InterChange iQ 2000plus can provide a significantly enhanced level of service beyond the basic Call interworking of InterChange iQ 2000.

The basic Q.931 protocol supported by many PBXs, ISDNs and IP network routers supports only a limited set of services, whereas DPNSS is service-rich. Thus, when interfacing DPNSS to a Q.931 network, InterChange is unable to communicate many DPNSS service requests to the Q.931 equipment. The outcome is that a number of calls, for instance diversions, cannot be established successfully.

To overcome this, InterChange iQ 2000plus provides a “proxy interworking” feature. When proxy interworking, IiQ 2000plus acts unilaterally to support DPNSS services on behalf of the Q.931 equipment. The services that can be supported in this way include Call Forwarding and most of the significant DPNSS Centralised Operator services.

Although the amount of service inter-operation varies a little, depending on the capabilities of the Q.931 equipment, the table below shows what can be achieved in most cases:

DPNSS Service	IiQ 2000plus Proxy Service
Diversion at DPNSS extension - Immediate - Busy - No Reply	IiQ 2000plus makes the diversion call (1).
- Diversion Validation	InterChange adsorbs the DPNSS signalling and provides an automatic positive response.
Operator Redirection	If a call transferred from a DPNSS operator to an IP 'phone is not answered the call will be returned to the operator after a configured time.
Operator Night Service	A call from IP to the DPNSS operator will be redirected to a DPNSS Night Service answering point if necessary.
Operator Series Call	Full support for the Series Call feature offered at many DPNSS operator stations.
General Redirection	Full support for calls from Q.931 'phones when the DPNSS PBX requests call redirection or redirection on call failure.

Note:

(1) This includes diversions to Q.931-attached 'phones, provided the DPNSS PBX's routing is correctly configured. Calls from Q.931 'phones that are proxy-diverted back to Q.931 occupy two circuits through InterChange to the DPNSS PBX. If the PBX cannot be configured to route incoming calls back down the same link so that they can reach the Q.931 equipment, such calls will fail.

InterChange can support a small degree of filtering on diverted-to party address, to prevent proxy diversion calls that would fail anyway being offered to back to the PBX; these detailed configuration options are available only through the manual configuration process described in section 6.

5.5 Interworking DPNSS with Cisco Call Manager

Cisco's AVVID™ Call Manager™ (CCM) IP PBX provides a Primary Rate Q.931 or QSIG interface for telephony via an IP connection to a voice enabled IP-network edge-device, usually an IOS router. When the IP traffic between CCM and the IOS router uses the MGCP protocol, CCM can provide a QSIG or Q.931 interface. When the IP connection uses the H.323 protocol CCM provides a Q.931 interface.

Using the Q.931 interfaces, Cisco's protocol support has some Q.932 Supplementary Service extensions that can be used to advantage in interworking to DPNSS. When used in conjunction with InterChange iQ 2000plus proxy interworking, this provides CCM with significantly enhanced call capabilities. The table below complements that for Proxy Interworking in the previous section, and shows the extra services that are available when CCM is connected in this way:

DPNSS	**Q.931**
Text (Name)	Calling Party Name
Diversion to DPNSS Voice Mail	From IP 'phone
Message Waiting [1] - Call Back Messaging - Manufacturer proprietary signalling	Indications from a DPNSS VMS IP 'phones (Message Waiting Light ON/OFF)

Note:

[1] There is no explicit message Waiting Indication Service in DPNSS. InterChange iQ 2000 systems support mappings to the standard DPNSS Call Back Messaging service, as used by Mitel and some Philips PBXs, and to proprietary signalling used by Ericsson, and Siemens (also Nortel) PBXs. Alternative proprietary signalling extensions can be configured as necessary.

CCM's QSIG service support is evolving and is expected eventually to reach the level at which the most appropriate interworking is provided by an InterChange iQ 2000 system configured for full interworking, as described in section 5.3 above.

6 Manual Configuration or Upgrade of Software Protocol Options

This chapter describes:

- General configuration rules and procedures to facilitate the installation of simple InterChange iQ 2000 and iQ 2000plus applications.
- The general procedure for interrogating and changing parameter settings during initial configuration.
- Configuration parameters common to all InterChange iQ 2000 conversions.
- Q.931/DPNSS conversion.

6.1 General Module Configuration Procedure

The procedures for installing and commissioning an InterChange iQ 2000 unit are described in *Chapter 2*. This section describes the configuration process in greater detail.

6.1.1 The Configuration Menu System

First connect a PC with Vision iQ to the management port, then:

1 Select **Configuration** from Vision iQ

2 Select **IQ2000 - CONFIG**, then

3 Type **ADV** for manual configuration

The main configuration menu is a list of options. Most of the main menu options display a submenu allowing configuration of one aspect of the module. All submenus allow you to display the current configuration settings, alter some, and return to the main menu. Some submenu selections provide another submenu. Others present a series of prompts that require a response.

When configuring some aspects of the system, you are asked to set ALL the relevant information and are not allowed to change just the options you require. Complete all value required columns, even where the default is satisfactory.

Ensure you have the configuration worksheets available for reference.

6.1.2 Menu Help Facilities

In any menu, type: **? <Enter>** to obtain a list of the options available to you. This only displays your input options, not the currently set values.

6.1.3 Confirming Configuration Changes

The **RSET** and **EXIT** main menu options are common to all conversion configuration menus.

RSET

When configuring a new system first select the reset option **RSET** to return all configuration values to their manufacturing default settings. Type: **RSET** <Enter>

Do not select this option if you are re-configuring a specific aspect of a working unit, or after you have correctly configured the unit.

EXIT

Once you are confident that the configuration is complete and correct return to the main menu and type: **EXIT** <Enter>

The parameters you have set are stored in non-volatile memory. The converter then initialises its operational software and enters its normal operational state.

Apart from the time and date, set in the **TIME** menu, no other parameters are finally stored in NVRAM until you **EXIT** from the main menu. If you reset the unit without going through this stage the previous settings are restored from NVRAM when the system restarts.

6.2 Manual Configuration and Upgrade Options

The configuration options common to all InterChange iQ 2000 and iQ 2000plus conversions are described in this section.

6.2.1 Resource Manager Configuration (MGMT)

The Resource Manager task (RM) exercises overall control over the functions of the module. The purpose of the RM is to control the behaviour of individual protocol stacks and the interactions which govern conversions. The RMs for the different conversions are very similar and the same configuration options are common to all.

The MGMT menu provides the dialogue you need to invoke if you have to perform field-upgrade of an InterChange iQ 2000 unit to InterChange iQ 2000plus. Before attempting an upgrade you will need to purchase the unit-specific upgrade license key, from your InterChange supplier.

6.2.2 Channel 0 Configuration (CZ) - Delay Timers

Two timers regulate the sensitivity of higher layer signalling to physical layer problems. The Delay Down Timer (DDOT) controls the speed with which higher layers are informed of a line problem. DDOT can be used to desensitise the higher layers to short term line failures of up to 100 tenths of a second (10 secs). If the line recovers within DDOT the higher layers are not informed of the problem. The Delay Up Timer (DUPT) controls the speed with which line recovery is reported. DUPT ensures that the line is properly recovered and stable before higher layers attempt to use it again. It can be set to up to 10 tenths of a second (1 sec).

The correct values for DDOT and DUPT are specific to the particular connection. For instance, some clear active calls after a line fault of 2 seconds. Consequently, if DDOT is set to 20 or more Interchange will not clear calls unilaterally.

DDOT and DUPT are independent of IDT. DDOT/DUPT regulate indications to higher signalling layers. IDT governs the physical layer handshake across Interchange.

6.3 Q.931/DPNSS Conversion Configuration

6.3.1 Port 1 (Q.931 port) Configuration

Layer 2 Configuration (Q921)

The default setting of the Q.931 port at Layer 2 (Q.921) is USER End. This must be configured with inverse orientation to the attached equipment/network.

As default, the Interchange iQ 2000 causes a Layer 2 RESET on recovery after physical layer failures. This causes all calls to be cleared when a Channel 0 fault is notified. Alternatively, the Interchange iQ 2000 can be configured to ignore Layer 1 fault indications and rely on periodic Layer 2 status polling to detect link problems.

The window size, used in Q.921 LAPD signalling, may be configured for each port. The default value of 7 interworks with the majority of Q.931 networks and equipment. Alternative values, between 1 and 127, can be set if necessary.

Layer 3 Configuration (Q931)

Q.931 Profile Selection

The Q.931 port can be profiled to conform to ETSI, AT&T (TR 41449), Euro-ISDN or QSIG definitions. The default is QSIG. For DPNSS/QSIG transparency the profile must be set to QSIG.

The ETSI profile is based on ETSI Specification ETS 300 102-1, (ref. [B.18]). The Euro-ISDN profile is based on the same specification, with amendments applied in ETSI specification ETS 300 102-1/A2, (ref. [B.19]). The differences between the ETSI and Euro-ISDN profiles relate to the content of messages; there are no changes to call set-up and clear-down.

It is recommended that Euro-ISDN profile should be used when not configuring the InterChange iQ 2000 for transparency, irrespective of a requirement for TBR-4 compliancy. Choose the ETSI profile only where TBR-4 compliancy is not required and where it is deemed the Euro-ISDN profile to be incorrect. Where TBR-4 compliance is required, the Euro-ISDN profile must be chosen.

Each profile sets particular defaults, appropriate to the standard definition, but these values can then be overridden by specific action, allowing customisation of the interface to non-standard equipment implementations. The rest of this section discusses these override options.

Protocol Orientation

The default Layer 3 configuration sets all Q.931 channels to **USER** orientation. This orientation can be altered to **NETWORK**.

Action on Link Layer RESET

As default, the Interchange iQ 2000 takes action to validate Q.931 call status for all fully active calls on notification of a Link Layer RESET. Calls are only cleared if not fully set up or there is a discrepancy in call state.

This can be reconfigured, to cause all calls to be cleared when a Layer 2 fault is notified, regardless of their state. If the glitch sensitivity has been reduced in Channel 0 configuration, it may be appropriate to clear calls once a fault is finally notified. Status validation should be adequate in most cases.

Overlap Signalling Support

If the Q.931 network/equipment supports overlap signalling, enable it by selecting **IN** for overlap from Q.931, **OUT** for overlap towards Q.931 or **BOTH**.

For transparent signalling, set overlap signalling to **BOTH** directions.

DPNSS Networks In the UK typically support overlap signalling for all calls. InterChange iQ 2000 can be made to block up incoming digits from DPNSS by setting this option to **N**(one) or I(n). In isolated cases it may be appropriate to turn on pre-emptive call forwarding in the Q.931 stack. This is very rarely required, but if needed operates as described for DPNSS, below.

If the Call Forwarding Timer is disabled (set **0**) the normal Q.931 T302 timer runs to clear incomplete calls after 15 seconds without dialling activity.

Default Private Network Number

The default Private Network Number is not required for transparency.

When operating into a DPNSS-based public network, which may address to the subscriber number only, with no private network extension number, it is mandatory that a private network extension number be supplied, so that non-DDI calls can be directed to a sensible destination such as the common operator. Normally this would be done in the Q.931 PBX, but in InterChange iQ 2000's AT&T and QSIG implementations it can be configured to be supplied by the Converter.

By default non-DDI calls are given a Q.931/QSIG Called Party Address of **0** as the ubiquitous operator number. This forwarding address can be customised by configuring the appropriate private network number, including any node address, as the Default Destination Address.

Interface ID

Set the Interface ID Enable configuration parameter to **N** on all InterChange iQ 2000 units.

6.3.2 Port 2 (DPNSS port) Configuration

Level 2 Configuration (LINK)

The default setting of Level 2 for the DPNSS port is A end. This must be configured with inverse orientation to the attached equipment/network.

Level 3 Configuration (DPNSS)

Default Private Network Number

The default Private Network Number is not required for transparency.

When operating into a Q.931-based public network, which may address calls to the subscriber number only, with no private network extension number, it is mandatory that a private network extension number be supplied, so that non-DDI calls can be directed to a sensible destination such as the common operator. Normally this would be done in the DPNSS PBX, but it can be configured to be supplied by the Converter.

By default non-DDI calls are given a DPNSS Called Line Identity of **0**, as the ubiquitous operator number. This forwarding address can be customisation by configuring the appropriate private network number, including any node address, as the Default Destination Address.

Destination Address Editing

There is no requirement for Address Editing when using transparency.

The destination address associated with calls from DPNSS can be edited before being passed out to Q.931, by discarding up to three leading digits. For example, a leading 9 inserted to cause the call to be routed to an outgoing public trunk can be stripped before the call is passed to the ISDN.

Pre-Emptive Call Forwarding

This feature is not required for transparent signalling.

Depending on whether the Q.931 implementation to which the PIM is interfaced fully supports overlap signalling it may be necessary to configure the Call Forwarding Time and/or Call Forward Address Length parameters in the DPNSS stacks.

These call forwarding parameters are used by the Converter, when overlap signalling is encountered in the direction DPNSS to Q.931, to recognise when no more digits are forthcoming and to indicate address completion and speed call set-up. Any edited out digits should be included in the count of address digits after which the call must be forwarded. They are not normally required when interfacing into a public network since the Network pre-empts such contrivances.

In both cases a value **0** turns the address-phase termination function off. The Call Forward Timer is an inter-digit timer.

Sub-Configured Links

DPNSS channels may be configured individually for operational service (i.e. the DPNSS link can be sub-configured). Q.931 calls will only be generated or accepted on those channels for which an equivalent DPNSS channel is configured.

Contention (Glare) Resolution

Provided all channels on the associated DPNSS link are configured as **X** the DPNSS equipment, being the **Y** end, gives precedence to incoming calls, so most channel contention problems are resolved in the DPNSS network.

Similarly it is advantageous, though not mandatory, if InterChange iQ 2000 can be configured as the ‘Network’ end of the Q.931 link, since this gives it precedence for calls over the attached ‘User’ end equipment.

Channel contention (glare) problems may be reduced further by influencing the choice of alternative channel. Select **H** or **L** as the Channel Allocation option, when configuring the DPNSS stack. **H** causes the highest, and **L** the lowest, free channel to be selected.

6.4 DPNSS/QSIG Transparency Options Configuration

Transparent operation between InterChange iQ 2000 systems across a QSIG or DPNSS network is supported by a variant of the Q.931/DPNSS product.

The additional options for the transparency product are described below.

6.4.1 DPNSS/QSIG Transparency

In this product variant both the DPNSS and Q.931 Layer 3 menus offer a transparency selection option, defaulted to **OFF**. This option must be enabled to run transparency.

Profile

To run transparency, then profile must be set to **QSIG**, as QSIG has the capability of supporting call independent signalling.

Support Transparent Transport Service

The options available are DISABLED/END/TRANSIT. The table below shows which option to select for particular transparent signalling:

	Port 1	**Port 2**
DPNSS over QSIG	TRANSIT	END

Select facility element coding (ETSI/ISO)

This option is displayed if **TRANSIT** has been selected. The options are **ETSI** or **ISO**. This must be set to the same facility element coding at each end.

Support Call Independent Signalling

This must be set to **Yes** to support non call associated signalling.

Channel Settings

The DPNSS CSET option allows you enable REAL and VIRTUAL calls. REAL calls are the same as call associated signalling in QSIG. VIRTUAL calls are the same as non-call associated signalling in QSIG.

REAL Calls

Enable Data Calls.

Node Transparency (DIS/END/TRAN)

The options available are DISABLED/END/TRANSIT. The table below shows which option to select for particular transparent signalling:

	Port 1	Port 2
DPNSS over QSIG	TRANSIT	END

VIRTUAL Calls

Enable Virtual Calls.

6.5 Advanced Service Interworking

6.5.1 DPNSS Message Waiting Implementations

Message Waiting service is not defined in DPNSS and therefore not always possible to find an interworking service match. Various manufacturers have defined proprietary signalling for turning ON and OFF Message Waiting indicators, or use the DPNSS Call Back Messaging service for this purpose. To configure InterChange to interwork QSIG Message Waiting Indication service with some of the more common PBXs:

First select **ADV** in the **Select configuration option ?** menu and then **IWRK**.

The sub-menu will allow you to display and change the signalling which sets Message Waiting indicators ON and OFF. The changes must be made independently to the ON and OFF strings.

The table below shows what should be selected in the Configuration Menu for the various manufacturer's products:

PBX	**Select**
Siemens iSDX and Realitis	**ISDX**
Ericsson	**MD110** If your network requires a Call Centre id, answer YES and enter the address of the Message Centre which will be appended automatically to the signalling string.
Mitel	No special configuration necessary. Mitel PBXs use the DPNSS Call Back Messaging which is pre-configured into InterChange iQ 2000.
Avaya Definity (as a DPNSS PBX)	**ISDX interworking**
Nortel PBXs (e.g. Meridian)	**ISDX interworking**
Other PBXs	Try the InterChange default first (DPNSS Call Back Messaging is pre-configured into InterChange iQ 2000). Next try ISDX or call Support for further advice. The configuration menus do allow you to set up other signalling if pre-set strings are inappropriate for your network.

DPNSS networks containing PBXs from more than one manufacturer

It is possible to combine some of the options described above. Selecting **BOTH** in the configuration of ON and OFF signalling, Ericsson, Mitel, Nortel and Siemens (GPT) PBXs will be covered. Contact Support for further advice.

6.5.2 ISDX Voice Messaging Systems

Siemens have implemented proprietary extensions to DPNSS Diversion to achieve better integration with their Voice Messaging Servers. InterChange iQ 2000 can be configured to attempt to interwork these extensions with the QSIG Call Forwarding service, although in some cases interworking is partial.

In iSDX/Realitis networks where there is a single VMS, InterChange iQ 2000 must be configured with the SPIDG address (the Logical Extension Identifier for the VMS hunt group - sometimes called the RFD address). This is unnecessary in multiple VMS networks, where the PBXs assert the required number explicitly in their RFD signalling.

InterChange iQ 2000 units have further advanced configuration options. Your support organisation may direct you to use these to resolve specific VMS interworking problems. The default configuration settings are correct for the majority of networks.

6.5.3 Name Mapping

InterChange iQ 2000 units support both the Q.931 display element to transfer name information (in either direction) and the QSIG Name Identification service options.

The most prevalent use of the display element option is by media gateway (DE30+) cards attached to the Cisco AVVID Call Manager, supporting Q.931 protocol (not QSIG). In this case the option is supported in the QUICK configuration wizard, which specifically asks whether configuration for AVVID attachment is needed when VOIP and Q931 have been selected.

Other options in the **ADV** menu may be accessed.

DPNSS

1 Select **DPNSS**,

2 Set Text-to-Name mapping **ON** in the CSET/REAL menu,

3 **EXIT** back to the Advanced Configuration Menu.

Q931

1 Select **Q931**,

2 Select **CUST**,

3 When asked Do you need to change the display to name mapping?, answer **YES**,

4 Select **SRVC** (for the ROSE service), **TEXT** (for display element mapping) or **BOTH**

5 **EXIT** back to the top level to perform any other configuration.

6.5.4 Route Optimisation Options

The DPNSS SSRV services configuration menu asks two additional questions when Route Optimisation/Path Replacement interworking is enabled:

Does PBX accept ROP-INV string (YES/NO) ?

and

Restrict ROP call ref mappings (YES/NO) ?

Use of DPNSS ROP-INV String

This is fully discussed in section 4.13, above.

Restricted ROP Call Reference Mappings

When InterChange interworks the QSIG Path Replacement Network Feature with DPNSS Route Optimisation it constructs a DPNSS Call Reference value from the Path Replacement parameters provided in QSIG, and vice-versa. The service parameter definitions do not match exactly; this has been rectified only in the most recent DPNSS specification (issue 7) and there are many PBXs that do not implement the upgraded standard.

The algorithm that older versions of InterChange iQ 2000 (up to release R2.0.5) used for constructing the Call Reference value produces inter-PBX addresses of the form …99xxxx These have been found to conflict with some DPNSS network numbering plans. The later InterChange releases use an alternative algorithm that is less likely to cause problems, but they still support the old algorithm for backwards compatible interworking.

This backwards compatibility support is not required when all InterChange units in a network are running release R2.1 or R2.2 software and can be disabled by answering YES to the question. However, there is no need to restrict the mapping unless you know your network numbering plan will conflict.

6.5.5 QSIG Facility Element Encoding

InterChange iQ 2000's QSIG Protocol and Supplementary Services support can be characterized to any one of three different QSIG definitions. These are:

- the original definition defined by ECMA on behalf of ETSI in 1993 (ETS 300 172 / ETS 300 239 versions 1 & subsequently adopted service specifications)
- the ISO definition, adopted in 1994 (ISO/IEC 11572/11582:1995 & services)
- the ISO-aligned definition adopted by ETSI in 1995 (ETS 300 172/239 versions 3 & services)

When the Q.931 QSIG protocol profile is selected the QSIG facility element encoding defaults to ETSI 1995.

To manually change the facility coding definition it is necessary to make changes in two distinct menu trees, the Q931 CUST (Q.931 customer specific configuration) menu and the IWRK (Service Interworking) menu

Q.931 CUST menu

From the ADV level menu:

1 Select **Q931**,

2 Select **SRVC**,

3 If asked Facility Element Coding (ISO/ETSI/ECMA) ? input the required selection (ECMA = ETSI 1993, ETSI = ETSI 1995),

If this question is not asked, you have not enabled any Supplementary Services that require use of these encodings.

4 EXIT back to the ADV menu to perform the next step in facility configuration.

IWRK menu

From the ADV level menu:

5 Select **IWRK**,

6 Select **SRV**,

7 Select **FAC**,

8 Select **ISO** if you need either the ISO 1994 or the ETSI 1995 definition, or **ETSI** for the ECMA 1993 definition,

9 EXIT back to the ADV menu to perform the next step in facility configuration.

Please beware the discrepancy between meanings of the **ETSI** selection in the two different menu trees.

We suggest you contact your Q.931 equipment supplier if one or more Supplementary services will not interoperate with InterChange's default ETSI (1995) encoding and you suspect the Q.931 equipment may be operating to an alternative standard. With some PBX equipment, more service capabilities are available with the PBX configured for ECMA (1993) rather than ISO operation.

6.5.6 QSIG Diversion Restriction

QSIG diversion restriction is an optional interworking feature, introduced at InterChange iQ 2000 release R2.0.5.

Certain DPNSS PBXs enforce an arbitrary constraint which prohibits a network user from diverting the 'phone to an off-net number (e.g. to a national mobile number). In a mixed network including such PBXs, the feature permits those QSIG PBXs which are capable of performing 'call forward by join' to offer off-net diversion without the diversion request being referred back to and rejected by the DPNSS PBX.

In DPNSS, on determining that a call is being attempted to a ‘phone against which a diversion is registered, the destination PBX signals this back to the originating PBX. It should then attempt a new call to the ‘divert to’ number identified by the destination PBX. Certain DPNSS PBXs enforce an arbitrary limit on the length of the ‘divert to’ number. If it exceeds that length, the PBX will not attempt to divert the call and the call fails.

Some QSIG PBXs overcome this restriction, without requiring action from the originating DPNSS PBX, by making the diverting leg of the call and joining the new and original call legs. InterChange iQ 2000 can now be set up to detect the condition (overlong divert-to-number) and change its signalling to trigger the QSIG PBX to take alternative diversion action. Where the length of the divert to number is not excessive, InterChange iQ 2000 units allow the QSIG diversion request to ‘interwork’ with the DPNSS PBX as normal.

Once configured, the diversion interception action is entirely automatic. It can only be turned off by reconfiguring the option.

Using Diversion Restriction

The diversion restriction problem has been encountered specifically in networks containing Ericsson MD110 PBXs using DPNSS signalling.

Limitations to Diversion Restriction

Diversion Restriction should not be used unless:

- the originating PBX refuses to implement certain kinds of diversion.
- you are certain your QSIG PBX(s) can perform call forward by join.

Note:

Call forward by join can result in non-optimal bearer paths (trombones). Because of the particular way the path is created, these may not always be optimised by subsequent path replacement requests.

Configuring Diversion Restriction

Changes in diversion behaviour can only be made using the InterChange iQ 2000 installation menus. The option is offered in the Q.931 **CUST** (customer specific configuration) menu.

Type **DISP** to display current settings and **CHNG** to change these settings. You will be asked a series of detailed questions; press **Return** to proceed to the next question without changing the current setting. The last question is:

Reject Rerouting requests to long numbers (yes/no) ?

Type **YES** and a supplementary question is asked:

Enter max. digits to allow in DVT request (0 to disable restriction) ?

Type in the length of the longest number you want to be referred back to the DPNSS PBX for diversion action. Definity will be stimulated to attempt its own diversion on target numbers exceeding this length. Type **0** to clear the restriction.

When you display the customer options settings, the current diversion restriction setting will now be shown as either:

No restriction on rerouting to long numbers

if the option is disabled, or:

All requests from QSIG to divert to a number longer than nn digits will be referred back to the QSIG PBX for local implementation

if it is enabled, where nn is the currently configured length restriction.

6.6 Configuring InterChange iQ 2000plus Proxy Services

For most applications the InterChange iQ 2000plus *QUICK configuration wizard* gives adequate control over the services to be proxied on behalf of Q.931 equipment, but some more detailed tuning is possible using manual configuration of these services on the DPNSS port.

6.6.1 Proxy Diversion Address Filtering

In particular, an address filter can be set to determine whether InterChange will attempt to make a proxy diversion or will reject the call immediately.

The filter operates by comparing the leading digits of the diverted-to number with a pre-set number. The InterChange iQ2000plus can be configured to attempt proxy diversion if the diverted-to address digits:

a match the pre-set exactly, including having the same number of digits as the pre-set (this allows you to permit only one proxy diversion address, e.g. to a voice mail system);

b match the preset digits up to the length of the pre-set, but the diverted-to address may be longer than the pre-set (if your network numbering plan uses a node numbering strategy, this allows you to confine proxy diversions to a single node or group of nodes, e.g. to within the DPNSS network only);

c fail to match the pre-set digit string, up to the length of that string (this is the inverse of the previous option; if your network numbering plan uses a node numbering strategy, it allows you to perform proxy diversions except to a single node or group of nodes, e.g. to exclude diversions to the Q.931 equipment);

d are any values (i.e., InterChange will attempt to proxy all diversion requests).

The address filter is set from the ADV level menu as follows:

1 Select **DPNSS**,

2 Select **CUST**,

3 Select **PROX**,

4 Select the option you want from the menu (shown overleaf):

ALL	option d, all values
MATCH	option a, exact match on the filter digits
INCL	option b, inclusive match on the filter digits
ALBUT	option c, not matching the filter digits
SET	set the filter digit string
DSBL	disable all proxy diversion

5 **EXIT** back up the menu tree

6.6.2 Operator Redirection

The Proxy Services menu also allows you to set the Operator Redirection timeout. Operator Redirection is described in section 4.14.2 and the QUICK configuration wizard is the easiest way to set this option.

To set the timeout through manual configuration from the ADV level menu:

1 Select **DPNSS**,

2 Select **CUST**,

3 Select **PROX**,

4 Select **REDTM**, you will be asked:

Enter no-reply timeout for operator redirect (seconds) [0 (off), 5 .. 30] ?

to which you can enter a number in the allowed range, or **0** to ensure the operator redirection capability is turned off.

5 **EXIT** back up the menu tree.

Note:

This configuration will not in itself enable Operator Redirection. This service is only provided when Proxy Diversion is enabled and the redirection timeout is set to a non-zero value.

6.6.3 Service Spoofing

The Proxy Services menu also allows you to determine whether further service spoofing should be enabled or disabled. Service spoofing covers the following areas:

- Automatic acknowledgement of DPNSS Diversion Validation requests
- Returning “last known” party number as update information to DPNSS if a call to or from a Q.931 ’phone is transferred within the DPNSS network. This information may inaccurate, since, unlike QSIG, the Q.931 protocol does not have a Connected Party number notification.

To enable / disable service spoofing through manual configuration from the **ADV** level menu:

1 Select **DPNSS**,

2 Select **CUST**,

3 Select **PROX**,

4 Select **SSPEN** to enable, or **SPOFF** to disable.

5 **EXIT** back up the menu tree.

7 Problem Determination

7.1 Introduction

This chapter on Problem Determination has sections which cover:

- Power on problems.
- First level diagnosis of operational problems.
- Detailed specific diagnostic and corrective procedures.

These sections are written for a user attending a new or failed installation. The most helpful information is obtained from the Vision iQ management equipment connected to an InterChange iQ 2000 or iQ 2000plus. Flow charts outline the initial diagnostic procedure, then direct the reader to specific procedures for the recommended recovery action.

These sections also provide an indication of the level to which remote diagnosis can assist. Reference is made to various commands which can be issued from a PC with Vision iQ, connected directly or via a modem.

When performing an installation, cabling problems are common. *Section 7.4.3 Port Failure Alarms* shows how to diagnose the majority of these, using the information shown on the status display.

7.2 Power-On Problems

When an InterChange iQ 2000 or iQ 2000plus unit is powered on it performs a series of self-tests to ensure the hardware is functioning correctly. Normal operation of the module is resumed only if all its tests are successful.

The four **STATUS** LEDs and the **Power** LED on the front panel indicate the progress of the tests.

If nothing is displayed follow the Power Supply diagnosis procedure in *Section 7.4.1*.

7.3 Operational Problems

The figure below shows how to pinpoint a failing piece of equipment or cabling by deduction from local equipment and Interchange alarm relay indications, assuming that the ISDN network and its diagnostic information are outside the control of the local management system.

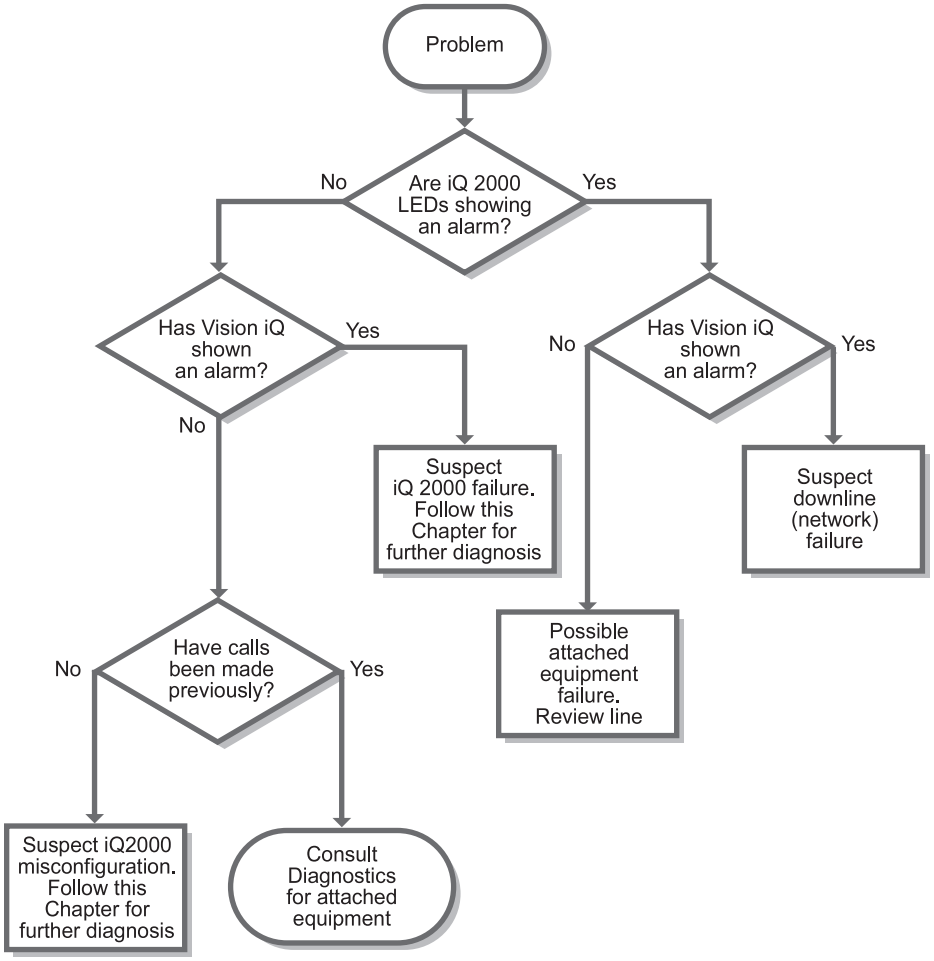

Figure 43: Problem Determination.

Problems are detected initially by one or a combination of the following symptoms:

- An alarm monitor detects that the alarm relay has triggered,
- A user complaint,
- An indication of Alarms from connected equipment, and or
- Error status on the LED display.

If a fault is indicated in the InterChange iQ 2000 unit or the network beyond, you can interrogate for the status of each port if management terminal access is available. Otherwise, examine the status indications on the InterChange iQ 2000 or iQ 2000plus.

Examine the status LEDs. In the normal operational state a LED is shown for each in-service port. If this is not the case follow the checks outlined in *Figure 44*. This first level chart guides you to the most appropriate of the specific diagnostic procedures described in *Section 7.4*.

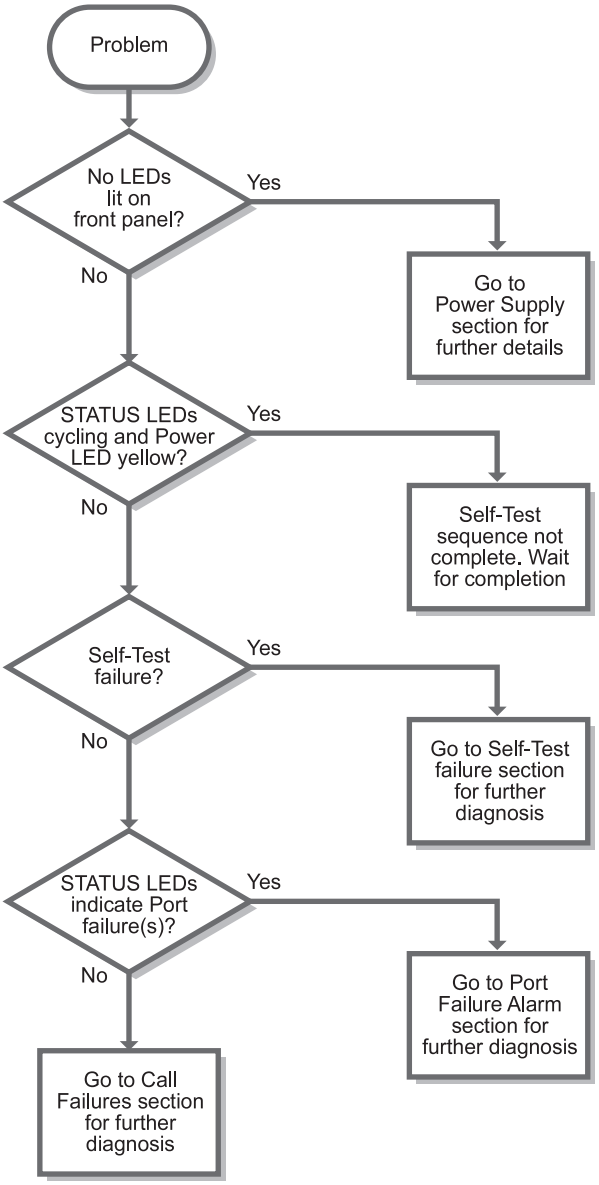

Figure 44: Problem Determination Check List.

7.4 Diagnostic Procedures

This section contains a set of diagnostic procedures which may be referenced directly or used in conjunction with the Operational Problems first level diagnosis flow charts.

Each procedure starts with a description of the symptoms of the error class, followed by a set of diagnostic actions which will allows the actual fault to be pinpointed more accurately. Once this has been achieved it should be possible for the user to attempt to correct the fault.

7.4.1 Power Supply

Symptoms

No LEDs illuminated.

Diagnostic Actions:

1 Check there is power to the unit and the unit is switched on.

2 Check for fuse failure in the power feed or on the rear panel of the unit.

3 If still unable to locate the problem, the InterChange iQ 2000 unit must be returned for repair.

7.4.2 Self Test Failure

Symptoms

The 'Power' LED remains orange.

Diagnostic action:

The hardware self-test has failed.

Cycle the Power on/off switch to reset the unit. If the unit continues to fail the self test:

- Contact your second line support engineers for assistance, if needed.
- Return the failed unit for repair, with a note of the error reported by the Vision iQ diagnostics.

The above procedure describes all that can be achieved on-site in the way of failures diagnosed by the self test software.

7.4.3 Port Failure Alarm

Symptoms

When there is a Port Failure alarm, it is indicated by either (or both) P1 and P2 LEDs coming on red.

Cause

The cause conditions are indicated by the **STATUS** LEDs as follows:

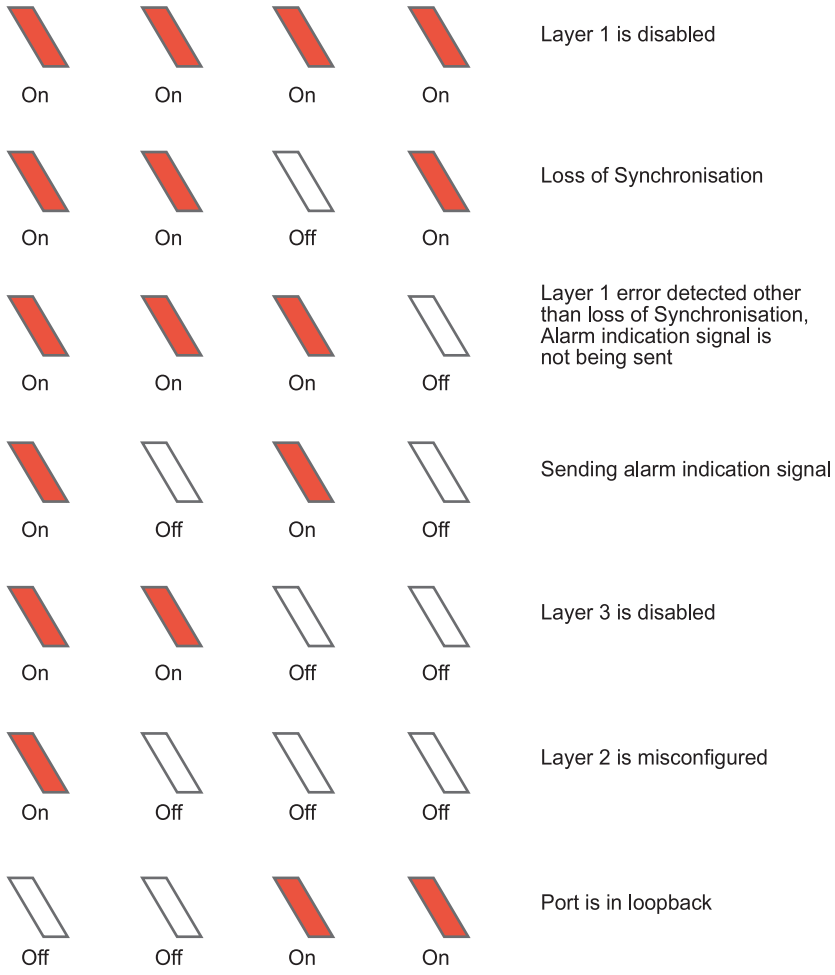
On On On On
Layer 1 is disabled
On On Off On
Loss of Synchronisation
On On On Off
Layer 1 error detected other than loss of Synchronisation, Alarm indication signal is not being sent
On Off On Off
Sending alarm indication signal
On On Off Off
Layer 3 is disabled
On Off Off Off
Layer 2 is misconfigured
Off Off On On
Port is in loopback

Figure 45: Table of Status LEDs

More detailed information can be obtained via management commands.

7.4.4 Checking Cables

- Check for continuity of both the inner conductor and the screen.
- Check for short circuits between the inner conductor and the screen.
- Check for correct attachment of connectors to cables.
- Hold the cables firmly and move the connectors to and fro thoroughly and re-check as above.
- Perform local and remote loop-back checks (see below) and ensure fault symptoms do not vary between them. If they do a cable fault is indicated.

7.4.5 Loop-Back Testing

Loop-back testing affects services as it takes the unit out of circuit and applies a logical loop to the TX and RX connections of a port so that input and output lines may be tested. Loop-back testing is only possible if a terminal can be connected to the InterChange iQ 2000 unit's **Management** port. To perform a loop-back test:

1 Make sure the lines are connected to the port to be tested. If the port is not connected a loop-back cable may be connected.

2 In the Diagnostics menu of Vision iQ, select **Loopback**.

3 In the loopback options window, select **Remote loopback**' and click on **Set.**

To remove the loop-back once the fault has been corrected:

1 In the loopback options window, select **Clear loopback** and click on **Set**.

2 Close the Loop-back window.

If a network port fails to come up it may have been disabled by the service provider at the local exchange. Call the network support number to request re-connection.

7.4.6 Call Failures

Symptom

The status LEDs show no faults but no calls can be made. There may be no indication of failure from attached equipment.

Diagnostic action

If the attached equipment is indicating a problem, it may be possible to diagnose the fault by referring to that equipment's fault finding documentation.

You can also monitor the InterChange iQ 2000 unit's ports in turn using a Primary Rate signalling protocol analyser. Check that calls are being received into the equipment and are being passed on to the associated port. If not, and the cause is not obvious from inspection of the analyser diagnostics, contact your support organisation for further guidance.

Symptom

Calls are dropped unexpectedly while in progress.

Diagnostic action:

The commonest cause is transient transmission problems on the network-side connections. If a management terminal is available use the Report Port Errors command in Vision iQ to check whether errors are occurring on either port. Alternatively, request that the network provider run checks on the connection.

Symptom

Higher than expected levels of unsuccessful call attempts.

Diagnostic action:

In a DPNSS environment some or all channels may be incorrectly configured at Layer 3 (set to **X** or to **Y** at both ends) causing failure to resolve channel contention correctly. Therefore, the configuration must be reviewed.

Symptom

DPNSS transparency is not achieved across a Q.931 network.

Diagnostic Action

The switching elements in Q.931 network do not support the Generic Functional Protocol, or do not have this function enabled. Therefore, the configuration must be reviewed.

Symptom

DPNSS services requiring virtual calls do not work.

Diagnostic Action

Switching elements in the Q.931 network do not support non-call-associated signalling or do not have this function enabled. Therefore, the configuration must be reviewed.

7.4.7 Fatal Errors

Symptom

Unexpected restart; calls in progress may be lost but the unit recovers within a couple of minutes and on examination appears to be functioning normally.

Cause

The software has detected an error which it can not correct. The problem could be due to a catastrophic hardware malfunction.

Any permanent hardware failure is discovered by the self test function and the unit will not be returned to service. If the fault was transient, the unit re-initialises, clears any calls which may have been left hanging, and resumes normal operation.

Once properly installed, configured and operational, InterChange iQ 2000 units are extremely reliable. Software-detected errors are seldom seen and it is usually impossible to diagnose the causative factors. Unless due to a persistent hardware problem, full recovery within a couple of minutes is automatic, although calls in progress at the time of the failure will have been cleared.

Diagnostic Action

The error is recorded in the unit's event log automatically.

When the unit has restarted:

1 Attach a terminal to the management port,

2 Obtain a report of alarm class events from the event log and locate the alarm record associated with the failure,

3 Note the contents of this record.

Any other error should be reported to your supplier.

7.4.8 Event Reporting

Each InterChange iQ 2000 and iQ 2000plus maintains an internal cyclic log of significant events and is capable of reporting the contents of this log to a terminal attached to the management port. During normal operation event reporting is disabled, but when investigating problem conditions it is possible to enable the event reporting function to assist in fault diagnosis. Reports may be filtered by class and severity to reduce the amount of information to be sifted.

If your supplier suggests that you do access the event log they should tell you what classes of event to filter. For most purposes it is only necessary to display Alarm conditions, but more detailed information is also maintained within the log in case of exceptional need. In practise the most common faults are port errors, and these conditions are normally diagnosed from the status LEDs or the port alarm log without needing to access the event log.

7.4.9 SNMP Traps

On an InterChange iQ 2000 or iQ 2000plus which has been configured to use Ethernet, certain error conditions will cause an Simple Network Management Protocol (SNMP) trap to be sent to a configured IP address. Up to eight such addresses may be configured. These will contain basic information, but on receipt of the trap, the user is intended to connect to the InterChange iQ 2000 unit using Vision iQ for a more detailed summary. The following events will result in a trap being sent:

- A port going out of service (port number sent as a parameter).
- A port coming into service (port number sent as a parameter).
- A layer 2 error (port number is sent as a parameter).
- Recovery of Layer 2 (port number sent as a parameter).
- A Layer 3 error (port number sent as a parameter).
- Recovery of Layer 3 (port number sent as a parameter).
- Impedance switch being changed (port number sent as a parameter).
- Clock synchronisation switch being changed.
- Flash failure.

- Error log overrun (i.e. events may have been missed).
- The InterChange iQ 2000 unit has been reset by management command.
- The InterChange iQ 2000 unit has been reset into Configuration Menus by management command.
- Outstanding Major Alarms have been acknowledged.

7.4.10 Call Tracing

Warning:

Call tracing is an intrusive process. Its use may SERIOUSLY compromise the performance of the product. It should only be used by, or under supervision of Westell engineers.

The Call Tracing product takes Layer 3 data and passes it through the capture filter (as defined by the user) and stores the result in a buffer on the shelf. The user may then specify a retrieval filter which returns the chosen data from the buffer and displays it to the screen and in a file.

Capture Filter

Allows the user to choose the lines and channels on which to capture data. Check the clear shelf buffer to clear the buffer of any previously captured data.

Retrieval Filter

Allows the user to choose the lines and channels on which to retrieve any previously captured data. It is also possible to retrieve messages according to time constraints, called party numbers, the call type (e.g. data calls only), the call state, (e.g. calls in progress only), or the stack type (e.g. originating stack only). It is not possible to set or reset the capture filter whilst retrieving data.

Call Trace Log

The Call Trace Log contains a text area in which the user may view data being currently retrieved, load a saved log, save/print the current log and stop the data retrieval, scroll through the current records using the scroll bar, and get the next/ previous set of records using the up/down arrow icons.

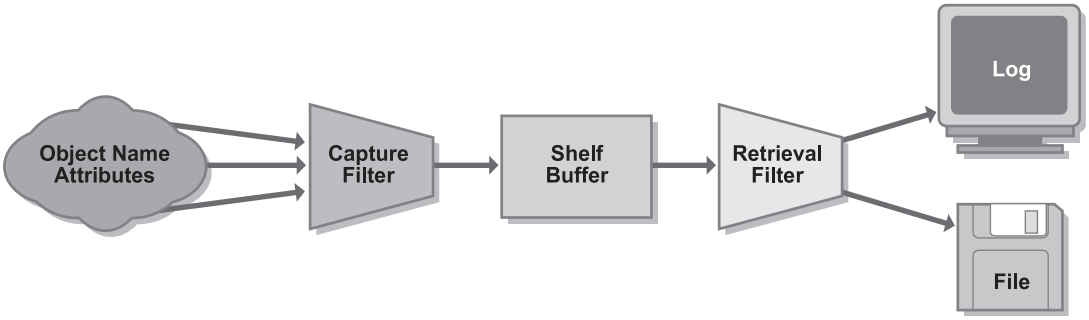

Figure 46: Call Tracing and Logging.

8 DPNSS Compliance Tables

The following tables give an indication of the level of compliance with the DPNSS supplementary services defined in BTNR 188 that can be achieved by a QSIG PBX interworking with DPNSS using the InterChange iQ 2000 or iQ 2000plus. Tables are derived from the Compliance section of BTNR188 for each service.

Note:

These compliance tables are provided to clarify the specified functionality provided by iQ 2000 and have been prepared with due care. However not all PBXs provide services in full compliance to the BTNR and in practise some deviations may be found in interworking two PBXs.

8.1 Basic Call

Compliance table for a PBX that supports the simple telephony call

Service Variant	Comply	Comment
Originate Simple Telephony Calls ?	y	
Receive Simple Telephony Calls ?	y	
Act as Transit for Simple Telephony Calls	y	

8.2 Data Call

Compliance table for a PBX that supports the circuit switched data call

Service Variant	Comply	Comment
Originate Circuit Switched-Data Calls ?	y	
Receive Circuit Switched-Data Calls	y	
Act as a Transit for Circuit Switched Data Calls ?	y	

Compliance table for a PBX with operators or extensions that are able to originate circuit switched data calls

Service Variant	Comply	Comment
Originate Circuit Switched Data Calls via Digital Traffic Channels ?	y	All common SICs supported
Able to originate Circuit Switched Data Calls via Analogue Traffic Channels	n	Voice band data can be carried via 3.1K Audio circuit

Compliance table for a PBX with operators or extensions that are able to receive circuit switched data calls

Service Variant	Comply	Comment
Receive Circuit Switched Data Calls via Digital Traffic Channels ?	y	All common SICs supported
Receive Circuit Switched Data Calls via Analogue Traffic Channels	n	Voice band data can be carried via any 3.1K Audio circuit

Compliance table for transit PBXs in a network that supports circuit switched data calls

Service Variant	Comply	Comment
Transit Circuit Switched-Data Calls between Digital Traffic channels ?	y	
Transit Circuit Switched-Data Calls between Analogue Traffic channels ?	n	Voice band data can be carried via any 3.1K Audio circuit
Transit for Circuit Switched Data Calls between Analogue and Digital traffic channels ?	n	Voice band data can be carried via any 3.1K Audio circuit

8.3 Executive Intrusion (Partial Support)

Compliance table for a PBX with operators or extensions in a network that supports executive intrusion

Service Variant	Comply	Comment
Accept an executive intrusion without prior validation call ?	n	
Accept an executive intrusion with prior validation call ?	n	
Respond correctly to an intrusion protection level request ?	n	Mandatory for full BTNR compliance
Send an intrusion protection level request ?	y	
Apply a delay time before intrusion takes place ?	n	
Re-ring the wanted party if it hangs up during intrusion?	n	
Default intrusion protection level assumed if signal not understood is indicated in response to intrusion level request ?	n	Mandatory for full BTNR compliance
Accept a withdraw from intrusion request ?	n	

Compliance table for a PBX with operators or extensions in a network that are able to request executive intrusion

Service Variant	Comply	Comment
Request executive intrusion without prior validation ?	y	
Request executive intrusion with prior validation?	n	
Request withdrawal from intrusion ?	n	

8.4 Diversion

8.4.1 Diversion - Immediate

Compliance table for a PBX with operators or extensions in a network that supports diversion immediate service

Service Variant	Comply	Comment
Make a diverted call via a separate channel on receipt of a Divert Immediate instruction from a called extension on another DPNSS 1 PBX?	y	
Make a diverted call to a PBX extension on receipt of a Divert Immediate instruction from a called extension on another DPNSS 1 PBX?	y	
Accept Diverted-Immediate calls via a separate channel from other DPNSS 1 PBXs?	y	
Process a Diversion Validation Request from other DPNSS 1 PBXs?	y	Always accepted
Extensions on the PBX able to request Follow-Me Diversion to extensions on other DPNSS 1 PBXs?	n	
Request, from the nominated extension, cancellation of the Diversion-Immediate Instruction on another DPNSS 1 PBX?	n	
Request Bypass of Diversion when it is encountered on another DPNSS 1 PBX?	y	

Additional compliance table for a PBX with extensions that are capable of having their calls diverted immediate

Service Variant	Comply	Comment
Process a Diversion Follow-Me Request or Cancellation from other DPNSS 1 PBXs?	y	
Bypass Diversion on own PBX extensions when requested by other DPNSS 1 PBXs?	n	
Inform another DPNSS 1 PBX that an incoming call has been Diverted Immediate to an extension within the PBX?	y	
Make a diverted call to another PBX when Diversion Immediate is encountered on a call between extensions on the PBX?	y	
Extensions on the PBX able to register a request that incoming DPNSS 1 calls are Diverted Immediate to extensions on other PBXs?	y	
Able to instruct incoming calls to Divert Immediate to extensions on other PBXs?	y	
Able to process a Diversion Immediate Cancellation from other DPNSS 1 PBXs	n	
Able to make a Diversion Validation Request to other DPNSS 1 PBXs	n	

Compliance table for a transit PBX in a network that supports the diversion on-busy service

Service Variant	Comply	Comment
Act as a Transit PBX for Diverted-Immediate Calls received on a separate channel to the original call?	y	

8.4.2 Diversion - On Busy

Compliance table for a PBX with operators or extensions in a network that supports diversion on-busy service

Service Variant	Comply	Comment
Able to make a diverted call via a separate channel on receipt of a Divert On-Busy instruction from a called extension on another DPNSS 1 PBX?	y	
Able to make a diverted call to a PBX extension on receipt of a Divert On-Busy instruction from a called extension on another DPNSS 1 PBX?	y	
Able to accept Diverted-On-Busy calls via a separate channel from other DPNSS 1 PBXs?	y	
Able to process a Diversion Validation Request from other DPNSS 1 PBXs?	y	
Able to request, from the nominated extension, cancellation of the Diversion-On-Busy Instruction on another DPNSS 1 PBX?	n	
Able to request Bypass of Diversion when it is encountered on another DPNSS 1 PBX?	y	

Additional compliance table for a PBX with extensions that are capable of having their calls diverted-on-busy

Service Variant	Comply	Comment
Able to Bypass Diversion on own PBX extensions when requested by other DPNSS 1 PBXs?	y	
Able to inform another DPNSS 1 PBX that an incoming call has been Diverted On-Busy to an extension within the PBX?	y	
Able to make a diverted call to another PBX when Diversion On-Busy is encountered on a call between extensions on the PBX?	y	
Extensions on the PBX able to register a request that incoming DPNSS 1 calls are Diverted On-Busy to extensions on other PBXs?	y	
Able to instruct incoming calls to Divert On-Busy to extensions on other PBXs?	y	
Able to process a Diversion On-Busy Cancellation from other DPNSS 1 PBXs	n	
Able to make a Diversion Validation Request to other DPNSS 1 PBXs	n	

Compliance table for a transit PBX in a network that supports the diversion on-busy

Service Variant	Comply	Comment
Able to act as a Transit PBX for Diverted-On-Busy Calls received on a separate channel to the original call?	y	

8.4.3 Diversion - On-No-Reply

Compliance table for a PBX with operators or extensions in a network that supports diversion on-no-reply service

Service Variant	Comply	Comment
Able to make a diverted call via a separate channel on receipt of a Divert On-No-Reply instruction from a called extension on another DPNSS 1 PBX?	y	
Able to make a diverted call to a PBX extension on receipt of a Divert On-No-Reply instruction from a called extension on another DPNSS 1 PBX?	y	
Able to accept Diverted-On-No-Reply calls via a separate channel from other DPNSS 1 PBXs?	y	
Able to process a Diversion Validation Request from other DPNSS 1 PBXs?	y	Always accepted
Able to request, from the nominated extension, cancellation of the Diversion-On-No-Reply Instruction on another DPNSS 1 PBX?	n	
Able to request Bypass of Diversion when it is encountered on another DPNSS 1 PBX?	y	

Additional compliance table for a PBX with extensions that are capable of having their calls diverted-on-no-reply

Service Variant	Comply	Comment
Able to Bypass Diversion on own PBX extensions when requested by other DPNSS 1 PBXs?	n	
Able to inform another DPNSS 1 PBX that an incoming call has been Diverted On-No-Reply to an extension within the PBX?	y	
Able to make a diverted call to another PBX when Diversion On-No-Reply is encountered on a call between extensions on the PBX?	y	
Extensions on the PBX able to register a request that incoming DPNSS 1 calls are Diverted On-No-Reply to extensions on other PBXs?	y	
Able to instruct incoming calls to Divert On-No-Reply to extensions on other PBXs?	y	
Able to make a Diversion Validation Request to other DPNSS 1 PBXs	n	
Able to make a Diversion Validation Request to other DPNSS 1 PBXs	n	

Compliance table for a transit PBX in a network that supports the diversion on-busy

Service Variant	Comply	Comment
Able to act as a Transit PBX for Diverted-On-No-Reply Calls received on a separate channel to the original call?	y	

8.5 Hold

Compliance table for a PBX with operators or extensions in a network that supports hold

Service Variant	Comply	Comment
Put an extension on hold on receipt of a hold request from another DPNSS 1 PBX ?	y	Hold not indicated to the QSIG PBX
Reconnect an extension which is on hold on receipt of a reconnected indication from another DPNSS 1 PBX ?	y	Call is not disconnected on the QSIG PBX side
Reconnect an extension which is on hold on receipt of an indication that the holding party has cleared and is being re-rung ?	y	Call is not disconnected on the QSIG PBX side

Additional compliance table for a PBX with operators or extensions that are able to request hold

Service Variant	Comply	Comment
Able to request that the other party in a call be placed on hold ?	n	Service not used in QSIG - local hold implemented
Indicate to the other party that it has been reconnected ?	n	Service not used in QSIG - local hold implemented
Re-ring the holding extension if it clears ?	n	Service not used in QSIG - local hold implemented

8.6 Three Party

Compliance table for a PBX with operators or extensions in a network which provides the three party service

Service Variant	Comply	Comment
Accept incoming enquiry calls via separate channel?	y	
Accept transfer to extensions on other DPNSS 1 PBXs via separate channel ?	y	
Accept being added into and split from a Three-Part Conference via a separate channel ?	y	

Compliance table for a PBX with operators or extensions that are able to request three party service

Service Variant	Comply	Comment
Establish an enquiry call to an extension on another PBX via a separate channel ?	y	
Able, as a Controlling PBX, to control Shuttle via a separate channel ?	y	
Able, as a Controlling PBX, to transfer calls to extensions on other DPNSS 1 PBXs (calls via separate channels)	y	
Able, as a Controlling PBX to establish and release a Three-Party Conference (calls via separate channels, conference bridge at the controlling PBX) ?	y	

8.7 Call Offer

Compliance table for a PBX with operators or extensions in a network that supports call offer

Service Variant	Comply	Comment
Accept a call offer request ?	y	
Accept an offered call by clearing the existing call ?	y	
Accept an offered call by placing the existing call on hold ?	y	
Indicate to the caller that the extension has rejected the offered call ?	y	
Accept a request to convert to executive intrusion on an offered call	n	

Compliance table for a PBX with operators or extensions in a network that are able to request call offer

Service Variant	Comply	Comment
Request that a call be offered to a busy extension on another DPNSS 1 PBX	y	Requires supplementary string programming
Take further action should the call offer be ignored by the wanted party for a length of time ?	n	
Request conversion to executive intrusion on an offered call ?	n	

8.8 Service Independent Strings

Note only the TEXTUAL DISPLAY string is supported.

Compliance table for a PBX that supports service independent strings ?

Service Variant	Comply	Comment
Send a textual display string	y	
Display text received in a ìTextual displayî string	y	

8.9 Bearer Service Selection

Compliance table for a PBX with operators or extensions that are able to request bearer service selection

Service Variant	Comply	Comment
Bearer Service Selection (BSS-M) to request specific transmission path capabilities on outgoing calls?	y	Capabilities set in administration
Bearer Service Selection (BSS-P) to request specific transmission path capabilities on outgoing calls?	y	Capabilities set in administration
Bearer Service Selection (BSS-P) to request specific transmission path capabilities on outgoing calls?	y	Capabilities set in administration

Compliance table for a transit PBX that supports bearer service selection

Service Variant	Comply	Comment
Select a transmission path for the ongoing routing of a call based on the Service requirements (BSS-M, BSS-P, BSS-N) included in a received ISRM or RM?	y	Capabilities set in administration

8.10 Route Optimisation

Compliance table for a PBX with extensions in a network that supports route optimisation

Service Variant	Comply	Comment
Establish a Route Optimisation Call Set Up on of a Route Optimisation Request? via a separate channel	y	
Establish a Route Optimisation Call Set Up on of a Route Optimisation Request? via the same channel	n	Single Channel Working not supported

Compliance table for a PBX with extensions and is able to initiate route optimisation

Service Variant	Comply	Comment
Send a Route Optimisation - Request?	y	
Accept and respond correctly to a Route Optimisation Call Set Up? via a separate channel	y	
Accept and respond correctly to a Route Optimisation Call Set Up? via the same channel	n	Single Channel Working not supported

Compliance table for a transit PBX in a network that supports route optimisation

Service Variant	Comply	Comment
Transit Route Optimisation Requests?	y	
Prevent Alternative Routing during Route Optimisation Call Set-Up received on a separate channel?	y	
Able to transit Route Optimisation Call Set-Up received on the same channel as the existing call? Non-branching	n	Single Channel Working not supported
Able to transit Route Optimisation Call Set-Up received on the same channel as the existing call? Branching	n	InterChange never a branching PBX function

8.11 Redirection

Compliance table for a PBX with extensions in a network that supports the redirection service

Service Variant	Comply	Comment
Accept redirected calls from other DPNSS1 PBXs? via a separate channel	y	
Accept redirected calls from other DPNSS1 PBXs? via the same channel	n	Single Channel Working not supported

Compliance table for a PBX with extensions and is able to initiate the redirection service

Service Variant	Comply	Comment
Initiate a redirected call? via a separate channel	n	Only Redirection back to originating attendant group supported
Initiate a redirected call? via the same channel	n	Single Channel Working not supported

Compliance table for a transit PBX in a network that supports the redirection service

Service Variant	Comply	Comment
Able to act as a transit for redirected calls received on a new channel?	y	
Able to act as a transit for redirected calls received on the same channel as the original call? Non-branching	n	Single Channel Working not supported
Able to act as a transit for redirected calls received on the same channel as the original call? Branching	n	InterChange never a branching PBX function

8.12 Centralised Operator

Compliance table for a PBX with extensions in a network that supports the centralised operator

Service Variant	Comply	Comment
Support the Three Party service in accordance with Table 2 of the Compliance for SECTION 13 of BTNR 188 ?	y	
Support Call Offer in accordance with Table 2 of the Compliance for SECTION 14 of BTNR 188 ?	Partial	But see notes on actions on receipt of call offer.
Support the Redirection service in accordance with Table 2 of the Compliance for SECTION 22 of BTNR 188 ?	y	
Support Executive Intrusion in accordance with Table 2 of the Compliance for SECTION 10 of BTNR 188 ?	n	Mandatory
Send service information when clearing back a call owing to a busy resource being encountered ?	n	
Support Route Optimisation in accordance with Table 2 & 3 of the Compliance for SECTION 19 of BTNR 188 ?	y	
Support Night Service in accordance with Table 2 of the Compliance for SECTION 25 of BTNR 188 ?	n	
Support Extension status service in accordance with Table 2 of the Compliance for SECTION 20 of BTNR 188 ?	n	
Support Controlled diversion in accordance with Table 2 of the Compliance for SECTION 21 of BTNR 188 ?	n	
Support Series Call service in accordance with Table 2 of the Compliance for SECTION 13 of BTNR 188 ?	n	
Support the Three Party Takeover in accordance with Table 2 of the Compliance for SECTION 24 of BTNR 188 ?	n	
Support the Hold service in accordance with Table 2 of the Compliance for SECTION 12 of BTNR 188 ?	y	

Compliance table for a PBX with operators a network that supports the centralised operator

Service Variant	Comply	Comment
Provide additional displays	y	
Include CLC-OP in all calls that are originated and received ?	y	
Able to support the Three Party service in accordance with Table 4 of the Compliance for SECTION 13 of BTNR 188 ?	y	
Support Call Offer in accordance with Table 3 of the Compliance for SECTION 14 of BTNR 188 ?	y	Requires supplementary string programming
Support the Redirection service in accordance with Table 3 of the Compliance for SECTION 22 of BTNR 188 ?	y	See notes
Support Executive Intrusion in accordance with Table 3 of the Compliance for SECTION 10 of BTNR 188 ?	y	Requires supplementary string programming
Support Night Service in accordance with Table 3 of the Compliance for SECTION 25 of BTNR 188 ?	n	
Support Extension status service in accordance with Table 3 of the Compliance for SECTION 20 of BTNR 188 ?	n	
Support Controlled diversion in accordance with Table 3 of the Compliance for SECTION 21 of BTNR 188 ?	n	
Support Series Call service in accordance with Table 3 of the Compliance for SECTION 13 of BTNR 188 ?	n	
Support the Three Party Takeover in accordance with Table 3 of the Compliance for SECTION 24 of BTNR 188 ?	n	
Support the Hold service in accordance with Table 2 of the Compliance for SECTION 12 of BTNR 188 ?	y	

Compliance table for a transit PBX in a network that supports the centralised operator

Service Variant	Comply	Comment
Support the Three Party service in accordance with Table 6 of the Compliance for SECTION 13 of BTNR 188 ?	y	
Support Call Offer in accordance with Table 4 of the Compliance for SECTION 14 of BTNR 188 ?	y	
Support the Redirection service in accordance with Table 4 of the Compliance for SECTION 22 of BTNR 188 ?	y	
Support Executive Intrusion in accordance with Table 4 of the Compliance for SECTION 10 of BTNR 188 ?	y	
Support Route Optimisation in accordance with Table 4 of the Compliance for SECTION 19 of BTNR 188 ?	y	
Support Night Service in accordance with Table 4 of the Compliance for SECTION 25 of BTNR 188 ?	y	
Support Extension status service in accordance with Table 4 of the Compliance for SECTION 20 of BTNR 188 ?	y	
Support Controlled diversion in accordance with Table 4 of the Compliance for SECTION 21 of BTNR 188 ?	y	
Support Series Call service in accordance with Table 4 of the Compliance for SECTION 13 of BTNR 188 ?	y	
Support the Three Party Takeover in accordance with Table 4 of the Compliance for SECTION 24 of BTNR 188 ?	y	
Support the Hold service in accordance with Table 4 of the Compliance for SECTION 12 of BTNR 188 ?	y	

8.13 Add-On Conference

Conference facilities are provided beyond the DPNSS specification - allowing up to six party conferences to be established by a single user using basic DPNSS telephony calls.

8.14 Do Not Disturb

Compliance table for a PBX with operators or extensions in a network that supports DND

Service Variant	Comply	Comment
Able as an outgoing PBX to respond correctly when it receives a DND indication from a called extension on another PBX ?	n	Mandatory
Request override of DND when it is encountered on another PBX ?	y	Requires supplementary string programming

Compliance table for a PBX with extensions that are capable of having a DND condition invoked

Service Variant	Comply	Comment
Able to inform another PBX that an incoming call has encountered an extension with DND invoked ?	n	Mandatory
Able to override DND when requested to do so by other PBXs ?	n	Mandatory

8.15 Loop Avoidance

Compliance table for an originating PBX in a network that supports loop avoidance ?

Service Variant	Comply	Comment
Able to insert a loop avoidance string in an ISRM or RM ?	y	Initial transit count value is configurable
Able to add an alternative-routing count to an inserted loop avoidance string ?	n	
Able to take special action on receipt of a loop avoidance string in a CRM ?	n	

Compliance table for a terminating PBX in a network that supports loop avoidance ?

Service Variant	Comply	Comment
Able to receive DPNSS 1 calls where the ISRM contains a loop avoidance string ?	y	Inherent DPNSS 1 capability

8.16 Network Address Extension

Compliance table for a PBX that can add destination subaddresses on outgoing calls

Service Variant	Comply	Comment
Add either decimal or binary form of subaddresses on outgoing calls ?	y	binary supported
React to indication that the NAE has been ignored ?	n	
Upper Limit imposed on subaddress length?	y	limit = 32

Compliance table for a PBX that has destinations to which subaddresses can be passed

Service Variant	Comply	Comment
Pass either decimal or binary form of subaddress to appropriate destinations ?	y	binary supported
Upper limit imposed on subaddress lengths ?	y	length = 32

A Approvals, Safety Instructions and Statutory Information

This information must be read prior to use of this equipment and overrides as appropriate any information in respect of connection and use of the equipment.

Address any enquiries regarding regulatory aspects of this equipment to Avaya.

Connection to Mains Voltage Supply

The wires in the mains lead are coloured in accordance with the following code. As the colours of the wire in the mains lead may not correspond with the coloured markings in the plug, proceed as follows:

- The wire coloured GREEN and YELLOW must be connected to the terminal marked E or by the earth symbol or coloured GREEN, or GREEN and YELLOW.
- The wire coloured BLUE must be connected to the terminal marked N or coloured BLACK or BLUE.
- The wire coloured BROWN must be connected to the terminal marked L or coloured RED or BROWN.

Replacing the mains fuse

Warning:

For continued protection against the risk of fire and shock hazard, replace fuses only with the same type and rating.

Fuse type: T2A H 250V.

Product Servicing

This product contains no user-serviceable parts. Any attempt by non-qualified personnel to gain access inside the product enclosure will compromise the terms of the approval quoted above. Should such access be attempted, liability will not be accepted if the equipment is shown subsequently not to be in compliance with the terms of approval.

Warning:

This equipment must only be installed and maintained by qualified service personnel.

Network Connections

This apparatus has been approved by the British Approvals Board for Telecommunication under Section 22 of the Telecommunication Act 1984 for connection to the following:

- Private Circuits at interfaces in the UK compatible with G.703 (75 Ohms) at 2048 Kbits/s, or
- Private Circuits at interfaces compatible with G.703 (120 Ohms) at 2048Kbits/s.

Equipment Port Classification

The ports are classified as follows:

Name	Type
Port 1	TNV1
Port 2	TNV1
Ethernet	SELV
Alarm	SELV
Management	SELV

Safety Compliance

Safety complies with EN60950, IE C950, AS/NZS 3260.

EMC Compliance

EMC complies with EN55022, EN50082-1, AS/NZS 3548.

Protective Earth Cable

The units must be installed with a protective earth in accordance with EN 60950:2000 Clause 6.1.2.2. This requires a PVC covered earth cable (longitudinal Green and Yellow coloured stripes in accordance with EN 60950 / IEC 950) and must be connected to the chassis earth stud on the back of the unit.

The specification of the earth connecting cable is:

Current rating 17 Amps, with a cross sectional area of 1.5 mm^2, Wire 7/0.53 mm. Terminated at the InterChange iQ 2000 unit with an M3 ring terminal 1-2.6 mm^2 conductor.

Note:

When the 75 Ohm BNC connectors are in use, permanent earthing replaces the requirements of clause 6.1.2 of EN 60950 as both the TNV and SELV circuits have an earth connection.

Lithium Cell

This product includes an Integrated Circuit which contains a Lithium Cell. This device is identified by the words Lithium Battery on its case and is fitted in position U4 on the processor card (GA 380 00101).

The following warning should be strictly adhered to. Do not attempt to open this device.

Caution:

Risk of explosion if battery is replaced with incorrect type. Dispose of used batteries according to instructions.

Do not dispose of in fire.

This warning must be strictly adhered to.

Flammability

Flammability meets the requirements of EN 60950, IEC950, and AS/NZS 3260.

Environmental

The InterChange iQ 2000 meets the requirements of ETS 300 019-2-3 and IEC 68-2 for Shock and Vibration.

CE Mark

To meet the essential requirements of the R&TTE Directive (1999/5/EC), the following declarations are made for CE marking:

EMC Declaration of conformity

The Interchange iQ 2000 product meets the requirements of the European Electromagnetic Compatibility (EMC) Directive 89/336/EEC.

The product complies with the requirements of EN55022 (CISPR 22) Radiated and Conducted Emissions and EN50082-1 Electromagnetic Immunity for limits of radio disturbance characteristics of Information Technology Equipment (ITE).

Warning:

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Note:

The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the apparatus concerned.

Safety Declaration of conformity

The InterChange iQ 2000 product meets the requirements of the European Low Voltage Directive (LVD) 73/23/EEC.

The product complies with the requirements of EN60950 for safety of information technology equipment, including electrical business equipment.

Special National Conditions

Norway

The local distributor of the InterChange iQ 2000 in Norway must attach a self adhesive label placed just above the fuse rating, which is situated above the mains inlet filter. This label displays the following text in Norwegian:

Apparatet ma kun tilkoples jordet stikkontakt

Sweden

The local distributor of the InterChange iQ 2000 in Sweden must attach a self adhesive label placed just above the fuse rating, which is situated above the mains inlet filter. This label displays the following text in Swedish:

Apparaten skall anslutas till jordat uttag nar den ansluts till ett natverk

Switzerland

The local distributor of the InterChange iQ 2000 in Switzerland must supply a moulded plug that conforms to SEC/ASE 1011.

Denmark

The local distributor of the InterChange iQ 2000 in Denmark must ensure that the power supply cord is provided with a moulded plug.

Pflichtinformation, Sicherheitshinweise und Zulassung

Lesen Sie diese Informationen, bevor Sie dieses Gerät in Betrieb nehmen. Diese Hinweise haben gegebenenfalls andere Hinweise bezüglich der Inbetriebnahme und des Gebrauchs des Geräts auf.

Richten Sie allfällige Fragen bitte an Westell Ltd. Sie finden die genaue Adresse auf der Innenseite der Deckseite dieses Handbuchs.

Anschluß an das allgemeine Stromnetz

Die Geräte, die an das allgmeine Stromnetz anschlossen werden sollen, sollen nur mit dem gelieferten Kabeln benutzt werden. Die Sicherheitssteckdose ist in der Nähe des Geräts installiert werden und leicht zu errechen sein.

Die Drähte in der Netzleitung sind in den folgenden Farben gekennzeichnet:

GRUN-UND GELB	ERDUNG
BLAU	NEUTRAL
BRAUN	LEITER

Warnung:

Für dauernden Schutz gegen die Feuergefahr. Ersatz nurmit gleichen typ und der Nennleistung der überspannungsicherung. T2A H 250V

Produktunterhalt

Dieses Gerät entält keine Teile, die vom Benutzer gewartet werden müssen. Jeder Versuch einer unqualifizierten Person, Zugang zum Inneren des Geräts zu erlangen, setzt die Garantiebestimmungen außer Kraft. In einem solchen Fall wird jede Haftung abgeleht, wenn sich herausstellt, daß der Zustand des Geräts nicht den für die Zulassung massgebenden Bedingungen entspricht.

Warnung:

Alle Unterhaltsaufgaben für dieses Gerät müssen von qualifiziertem Personal ausgeführt werden.

Lithiumbatterie

Dieses Produkt entält integrierte Schaltkreise, die eine Lithiumbatterie enthalten. Die Gehäuse dieser Schaltkreise sind mit “Lithium Battery” gekennzeichnet und auf der Prozessorkarte (GA 38000 101) auf den Positionen U4 installiert.

Vorsicht:

Explosionsgefahr wenn Batterie ersetzt durch falsche Type. Wenden Sie die Batterien an, den Weisungen nach.

Nicht ins Feuer werfen!

Halten Sie sich in jedem Fall an diese Warnung.

Sicherheit

IEC950, EN60950, AS/NZS 3260

Zustand der Pforte

PRI1 - Pforte	TNV1
PRI2 - Pforte	TNV1
Ethernetpforte	SELV
Managementpforte	SELV
Alarmpforte	SELV

Entzündbarkeit

InterChange iQ 2000 erfüllt die Anforderungen an Brandschutzgehäuse wie sie in EN60950 definiert sind.

Umweltverträglichkeit

InterChange iQ 2000 erfüllt die Anforderungen von ETS 300 019-2 and IEC68-2.

CE Prüfung

Dieses Produkt erfüllt die Anforderungen der R&TTE Richtlinie 1999/5/EC für CE.

EMC-Einhaltung

Dieses Produkt erfüllt die Anforderungen der Richtlinie 89/336/EEC.

Dieses Produkt erfüllt die Anforderungen der Norm CISPR 22 (EN55022) ‘Grenzwerte und Meßverfahren für Funktionsstörungen von Einrichtungen der Informationstechnik’ und der Norm EN50082-1 ‘Elektromagnetische Verträglichkeit (EMC) Fachgrundnorm Störfestigkeit, Teil 1’.

Warnung:

Dies ist ein Produkt der Klasse A. In einer Haushaltumgebung könnte dieses Produkt zu Störungen des Radio- und Fernsehempfangs führen. In diesem Fall müsste der Benutzer dieses Produkts allenfalls angebrachte Maßnahmen treffen.

Hinweis:

Eine Haushaltumgebung ist dann gegeben, wenn innerhalb einer Distanz von 10 Metern vom Produkt möglicherweise Fernseh- und Radioempfänger benützt werden könnten.

Netzsicherheit

Dieses Gerät erfüllt die Anforderungen von 73/23/EEC. Dieses Gerät erfüllt die Anforderungen von EN 60950 über die Sicherheit von Einrichtungen der Informationstechnik.

B References & Technical Specifications

References

[1] CCITT G.703:1998 Series G: Transmission Systems and Media, Digital Systems and Networks - Physical / Electrical Characteristics of Hierarchical Digital Interfaces.

[2] CCITT G.704:1998 Series G: Transmission Systems and Media, Digital Systems and Networks - Synchronous Frame Structures used at 1544, 6312, 2048 and 44 736 kbits/s Hierarchical Levels.

[3] (Safety, Europe) EN 60950:1992 Information processing and business equipment with amendments 1, 2, 3 and 4.

[4] (Safety, Europe) EN 41003:1996 Equipment to be connected to telecommunication networks.

[5] (Safety, Europe) ETS 300-046:1992 Parts 1, 2 and 3 ISDN primary rate: safety and protection.

[6] (Safety, International) IEC 950:1993 Information processing and business equipment with amendments 1, 2, 3 and 4.

[7] (Safety, Aust. and NZ) TS001:1997 / AS/NZS3260:1993 Information processing and business equipment, terminal equipment safety.

[8] (EMC, Europe) EN55022:1998 Radio frequency emissions, ITE / telecoms emissions.

[9] (EMC, Europe) EN50082-1:1997 Electromagnetic compatibility generic immunity standard for domestic, commercial and light industrial environments.

[10] (EMC, Europe) EN61000-3-2:1995, EN60555-2 LF Conducted emissions (harmonics)

[11] (EMC, Europe) EN61000-3-3:1995, EN 60555-3 Voltage fluctuations

[12] (EMC, Europe) ETS 300 386:1994 EMC Requirements for Public Telecoms Network Equipment.

[13] (EMC, International) CISPR22:1997 Radio frequency emissions, ITE / telecom emissions.

[14] (EMC, Aust and NZ) AS/NZS 3548:1997 Limits and methods of measurement of radio interference characteristics of information technology equipment.

[15] (Environmental, Europe) ETS 300 019:1994, Part 2 Environmental conditions and environmental tests for telecommunications requirements

[16] (Environmental, International) IEC-600 68-2 series, Basic environmental testing procedures

Technical Specifications

Environmental

Ambient Temperature:	Operating: 0 C to +40 C.
	Storage: -10 C to +60 C.
Relative Humidity:	5% to 95% (non-condensing).
Safety:	Conformant with EN60950 [3]; EN41003 [4]; ETS 300-046 [5]; IEC950 [6]; TS001/AS/NZS 3260 [7].
RFI Emissions (Class A):	Designed to meet EN 55022 [8]; En61000-3-2 [10]; EN61000-3-3 [11]; ETS 300 386 [12]; CISPR22 [13]; AS/NZS 3548 [14].
RFI Immunity:	Designed to meet EN 50082-1 [9].

Physical

Height:	50 mm.
Width:	275 mm.
Depth:	217 mm.
Chassis:	Pressed steel with black paint finish.
Front Panel:	Injection moulded plastic (with view windows for LEDs).
Mass:	1.4 kg.
Cooling	Convection cooled (should be sited to allow free movement of air).
Mounting	Free standing. 19" Rack mounting kit is available separately.

Reliability

MTBF:	> 30,000 hours.
MTTR:	30 minutes. There is no field repair option. The unit is replaced and returned for factory repair.

Real Time Clock/NVRAM Device

This device is powered by a Lithium battery:

Predicted Operational Life:	> 20 years.
Predicted Storage Life:	1 year at 70° C, or 4.8 years at 30° C, worst case.
Clock Accuracy	± 1.6 Minutes per month at 25° C.

Power

Operating Input Voltage Range:	100 to 240 VAC.
AC Frequency:	50 to 60 Hz.
Power Consumption:	Maximum 10 Watts.
Power Supply:	Integral Universal Input Power Supply Unit.

Primary Rate Interfaces

Primary Rate Interfaces:	2
Connectors:	RJ 45 (120 Ω) or BNC (75 Ω)
Line Interface:	CCITT G.703[3], 2.048Mbits/s, 120 Ω balanced or 75 Ω unbalanced.
Line Encoding	HDB3, clear channel capability.
Frame Structure	CCITT G.704 at 2.048Mbit/s [2]; CRC-4 multiframe mode.
Sub-equipped channel configurations	Fully configurable in DPNSS
Frame loss & alignment	CCITT G.706 at 2.048Mbit/s
Signalling Channel	TS 16 Common channel signalling timeslot 16
Signalling Protocols	DPNSS BTNR 188 Issue 5 sections 1-7 plus some supplementary services; Q.931 (ETSI) ETS 300 102 (1990); Q.931 (AT&T):AT&T TR 41449 (1989) (2.048 Mbit/s only, NFAS optional); Euro-ISDN:ETS 300 102 (1990) modified by ETS 300 102-1/A2 (1993) [ref. 0]; QSIG: ETS 300 172 (1992).
Signalling Orientation	All protocols fully ET/PBX configurable
Conversion option:	
DPNSS:	Q.931 (ETSI/AT&T/QSIG/Euro-ISDN selectable)

Clocking

Clock Source:	The unit can be synchronised to either primary port. The choice of port is made via a switch located on the rear panel of the unit.
Internal Clock Stability:	E1 - 2.048Mbit/s ± 100 ppm

Management Terminal Interface

Interface:	V.24/V.28 (RS232).
Connector:	9 pin, female D type.
Modem Control:	None.
Flow Control:	XON/XOFF.
Speed:	38400 bit/s.
Characteristics:	8 bits, no parity, asynchronous, 1 stop bit.
Configuration:	Interactive ASCII menu text interface.
Management Protocol:	Structured ASCII command/response interface.

Alarm Connector - Alarm Relay Contacts

Connections:	Weidmüller BL5.08 Orange 3 way connector with terminal screws.
Pin 1:	Normally Open (NO) (left pin when looking at the rear panel).
Pin 2:	Common.
Pin 3:	Normally Closed (NC).
Maximum voltage/current	60V at 500mA over the operating ambient temperature range.

Ethernet Connector Contacts

Connections:	RJ45 connector.
Pin 1:	TXD+.
Pin 2:	TXD-.
Pin 3:	RXD+.
Pin 6:	RXD-.

C Cabling Specifications

This Appendix specifies those cables which are to be supplied by the user if necessary for the configuration.

Connection to ISDN Networks and Equipment

These are connections to the Network / User. Each unit has two ISDN ports labelled Port 1 and Port 2.

Conversion Type	Conversion	
	PORT 1	PORT 2
Q.931 / DPNSS	Q.931	DPNSS

Connection to ISDN equipment and network is by either 75 Ohm unbalanced or 120 Ohm balanced cables, terminated at the Interchange iQ end in a pair of BNC connectors for 75 Ohm or an RJ45 connector for 120 Ohm.

Management Terminal Connection

When on-line control of InterChange iQ 2000 is required a permanent connection must be established to the 9-way female D-type connector labelled **Management**, at the rear of the unit.

The maximum cable length is 30 metres (100 ft).

A terminal runs at 38400 baud, 8 data bits, 1 stop bit, no parity, with XON/XOFF flow control. If a modem link is being used for the management terminal connection, connect the modem to the management port using a straight through DTE-DCE cable, with a minimum of TX, RX and Signal Ground pins connected. The modems must have XON/XOFF pass through enabled.

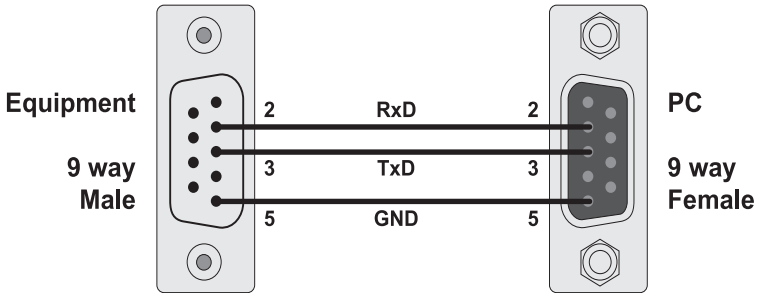

Figure 47: Management Terminal Connection.

Modems do not have to be from the same manufacturer but **must** be capable of working with compatible protocols and capable of certain functions.

Modems used must have the following configurable options:

OPERATION MODE	ASYNC
FIXED DTE RATE OF	38400, 8 DATA BITS, NO PARITY, 1 STOP BIT
LINE SPEED	MINIMUM OF V22 BIS
XON	CHAR 17 (11 HEX)
XOFF	CHAR 19 (13 HEX)
REMOTE FLOW CONTROL	ON
LOCAL FLOW CONTROL	XON/XOFF
PASS XON/XOFF	ON
COMMAND ECHO	OFF
QUIET	ON
AUTO ANSWER	ON/OFF
DTR OPTION	IGNORE DTR

D Glossary of Terms

This is a Glossary of Terms and Acronyms used throughout this User Guide.

Word/ Phrase/ Acronym	Meaning
A	
AIS	Alarm Indication Signal. A signalling condition of all ‘1’s on a Primary Rate interface, indicating that the PRI equipment has failed.
API	Applications Programming Interface. The programming interface available to a designer creating an application to use some service (such as a management service).
ASCII	American Standard Code for Information Interchange.
B	
BER	Bit error rate (or Ratio). Usually accounted in terms such as ‘1 in 10-3’, ‘1 in 10-5’.
BTNR	British Telecommunications Network Requirements
C	
CCITT	International Telegraph and Telephone Consultative Committee. Now renamed to ITU.
CLI	Command Line Interpreter. The task which runs the serial I/O interface and interprets external management (API) messages into internal messaging structures and vice versa.
CRC	Cyclic Redundancy Check.
CCS	Common Channel Signal.
D	
DPNSS	
DPNSS 1	Digital Private Network Signalling System Number 1. A protocol and set of facilities, designed by British Telecom, Department of Trade and Industry and PBX Manufactures for use between private digital PBX’s. Usually called just DPNSS.
E	
E1	A European 2.048 Mbit/s Primary Rate line.
ETSI	European Telecommunications Standards Institute.
G	
GUI	Graphical User Interface.

H

HDB3	High Density Bipolar 3. A coding scheme used across a circuit between multiplexers.

I

ISDN	Integrated Services Digital Networking. A set of standards and associated facilities defined by ITU (CCITT), refined for use in Europe by ETSI.
ITU	International Telecommunications Union - new name for the CCITT.

L

LED	Light Emmitting Diode.
LOS	Loss of Signal.

M

MMI	Man-Machine Interface. The presentation characteristics of the operational interface.
MTBF	Mean Time Between Failures. Can relate to software or hardware faults, more correctly to all faults. Normally, but not exclusively, used to measure major faults (i.e. total outage of a subsystem, requiring board replacement or software reset) rather than transient faults affecting only a subset of the services (such as a call failure).
MTTR	Mean Time To Return (or Repair or Recovery). Average time for repair/ recovery from a major fault. Does not imply that on-site attendance is necessary for recovery.

N

NVRAM	Non-Volatile Random Access Memory. Such as battery protected memory or ‘Flash’ memory.

Q

Q.931	An ITU/CCITT standard that specifies a network layer protocol and facilities for Private and Public digital exchanges.

R

RAI	Remote Alarm Indication. An indication in the channel framing information on a Primary Rate Interface showing that the equipment signalling the condition detects a problem in the link or attached equipment.
RAM	Random Access Memory.
ROM	Read-Only Memory.

S

S/W	SoftWare.

T

TCP/IP	Transmission Control Protocol/Internet Protocol. The standard procedure for regulating transmission on the Internet.

V

Vision iQ	Management Tool (PC application for Windows®) for InterChange products.

Westell limited
Ringway House
Bell Road
Daneshill
Basingstoke
Hampshire, RG24 8FB
United Kingdom

Tel: +44 (0) 1256 843311
Fax: +44 (0) 1256 840429
email: info@westell.co.uk
www.westell.co.uk